김현승 (한국학중앙연구원 디지털인문학연구소)

Protege™

1

프로테제 다운로드 및 실행

ontology editor

knowledge acquisition system

무엇을(what)

Stanford University

University of Manchester

누가(who)

free, open source

어떻게(how)

1987

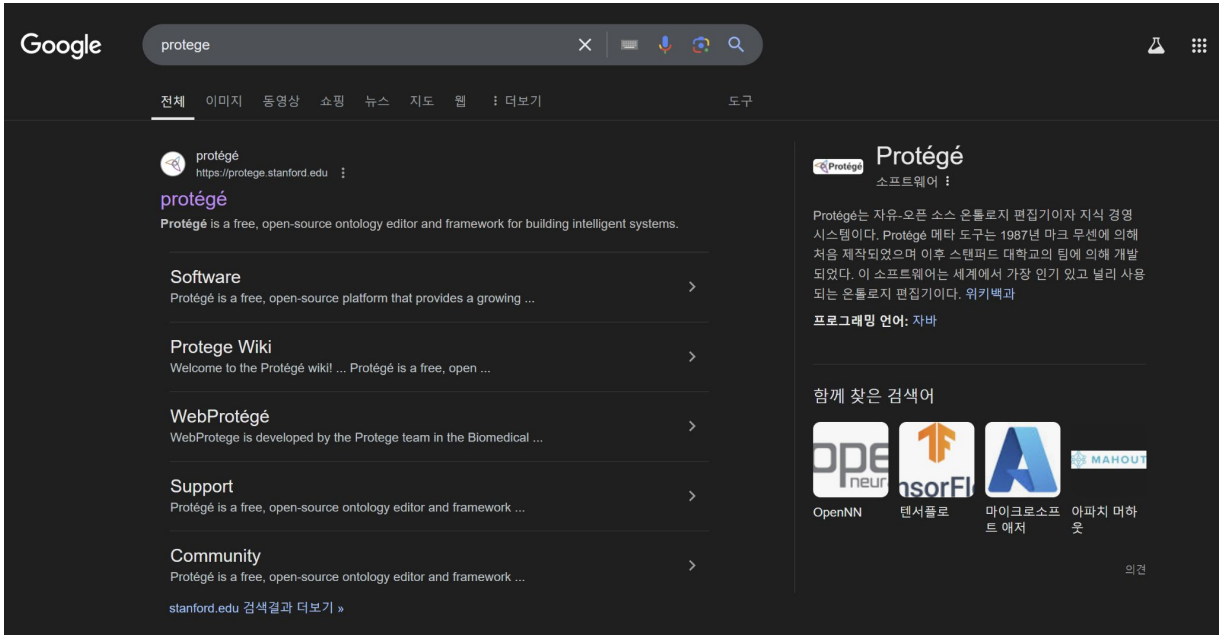
언제(when)

http://protegewiki.stanford.edu/

어디에서(where)

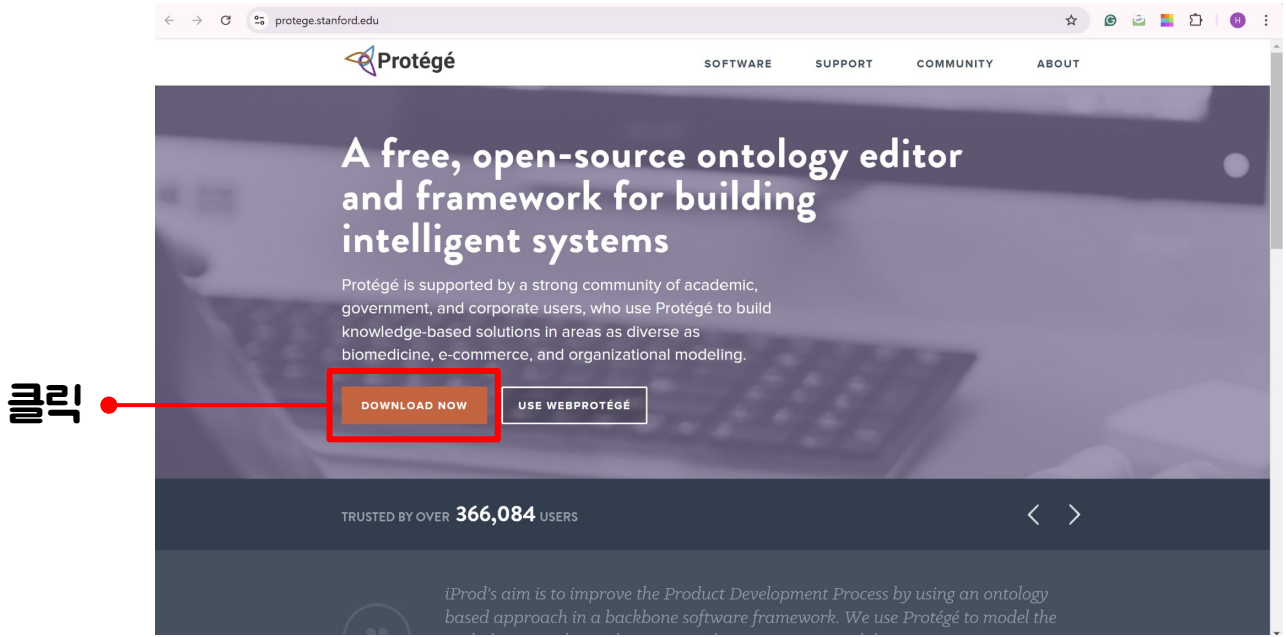
프로테제 다운로드

❖ 인터넷 검색창에서 protege 검색 → 홈페이지 클릭



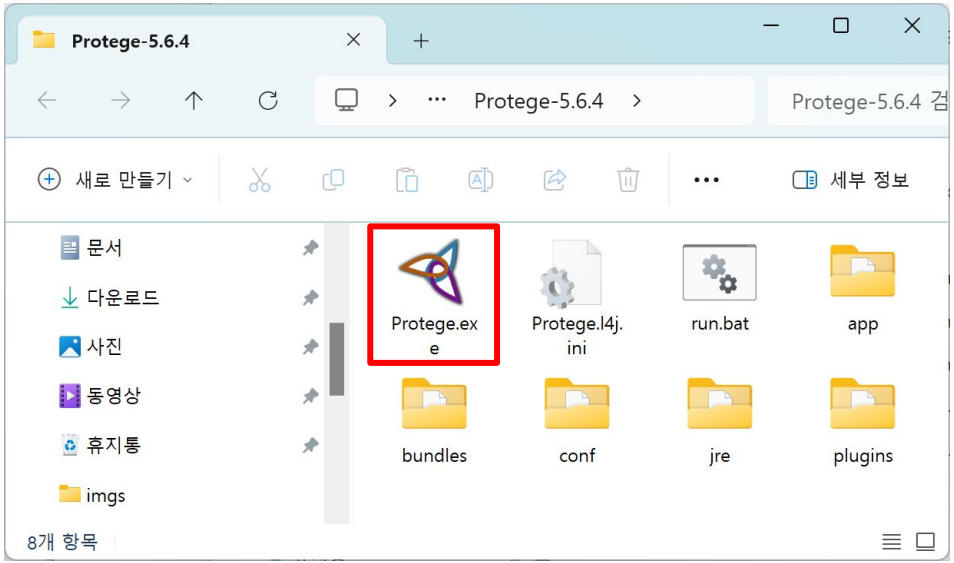
프로테제 다운로드

❖ DOWNLOAD NOW 버튼 클릭 → 파일 설치 및 실행



프로테제 다운로드

❖ 다음에 작업할 때에는 Protege 폴더에 있는 Protege.exe 파일을 실행하여 사용하면 된다.

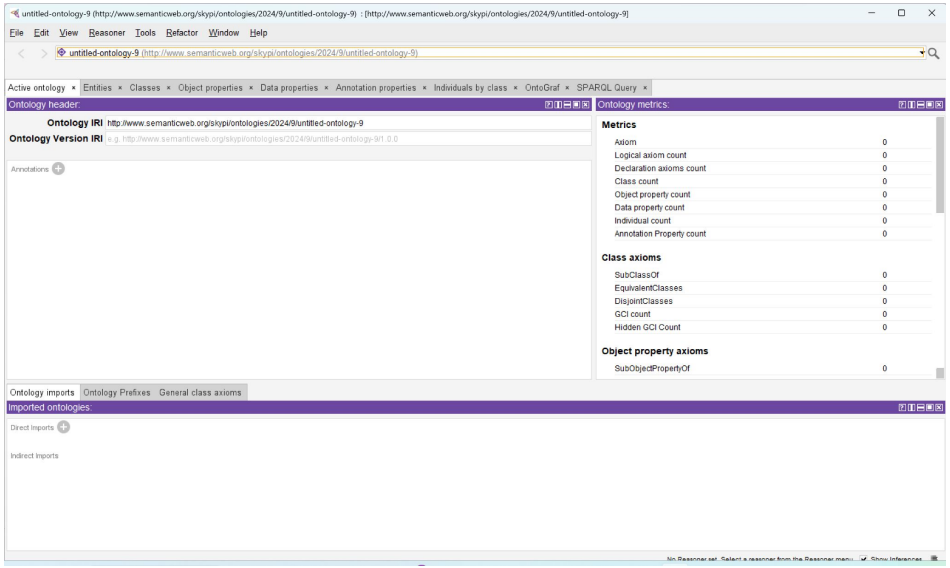


2

프로테제 화면 구성

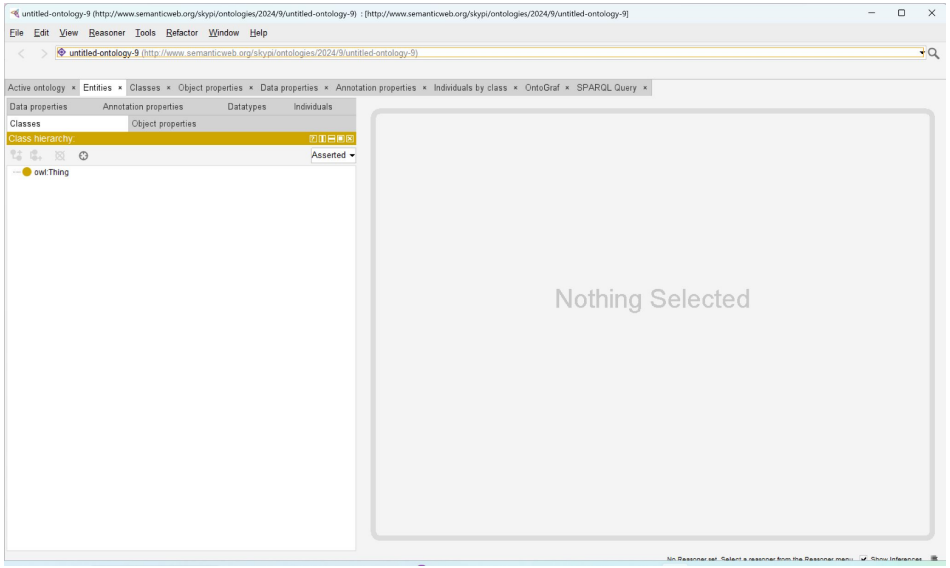
Active Ontology : 온톨로지 개괄

- ❖ 처음엔 Active Ontology 화면이 나타난다.
- ❖ 온톨로지에 대한 기본적인 설명을 작성한다.



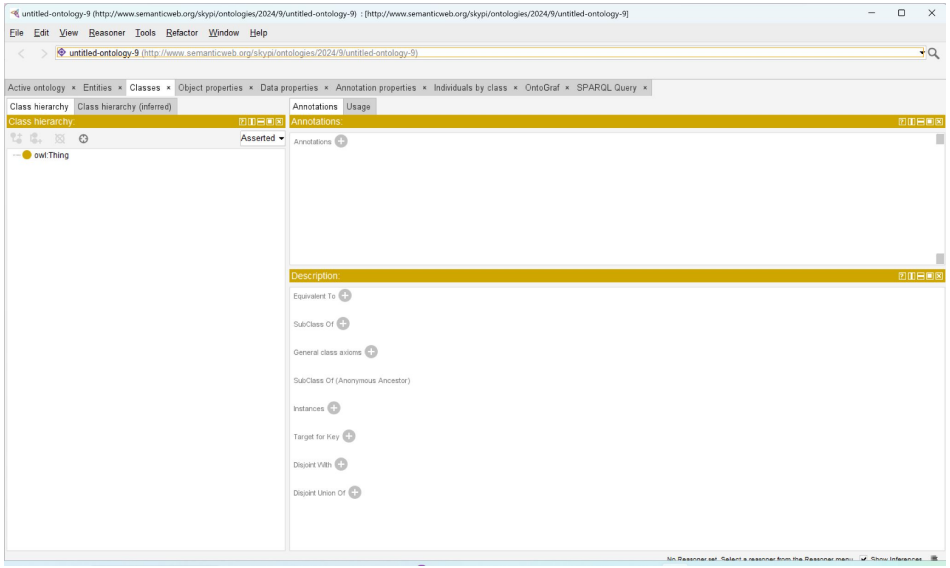
Entities : 통합 작업 환경

- ❖ 엔티티라고 하는 통합 작업 환경 창을 볼 수 있다.
- ❖ Class, Property, Relation 등 통합적으로 작업하는 곳이다.



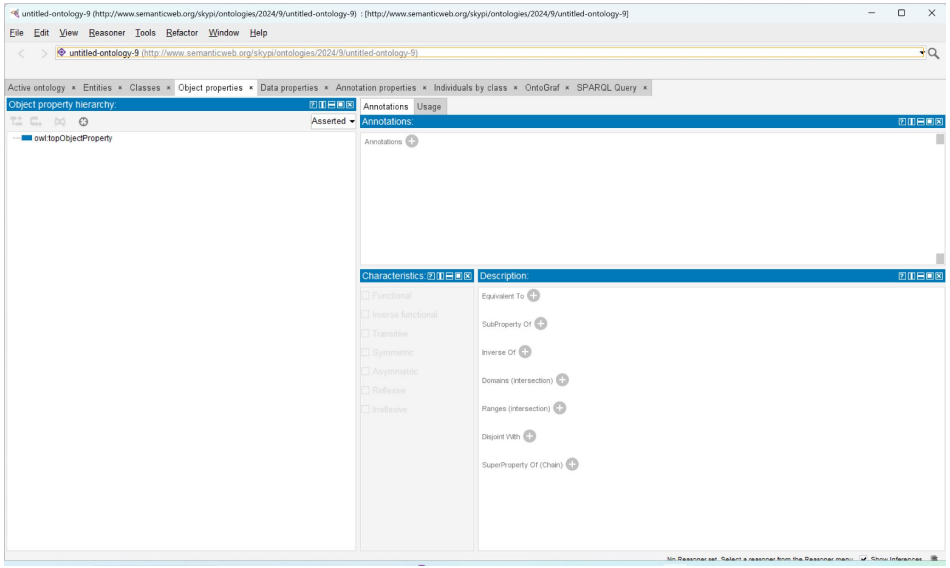
Classes : 클래스 작업 환경

- 클래스 작업을 할 수 있는 곳이다.
- 개체들의 범주를 설정해준다.



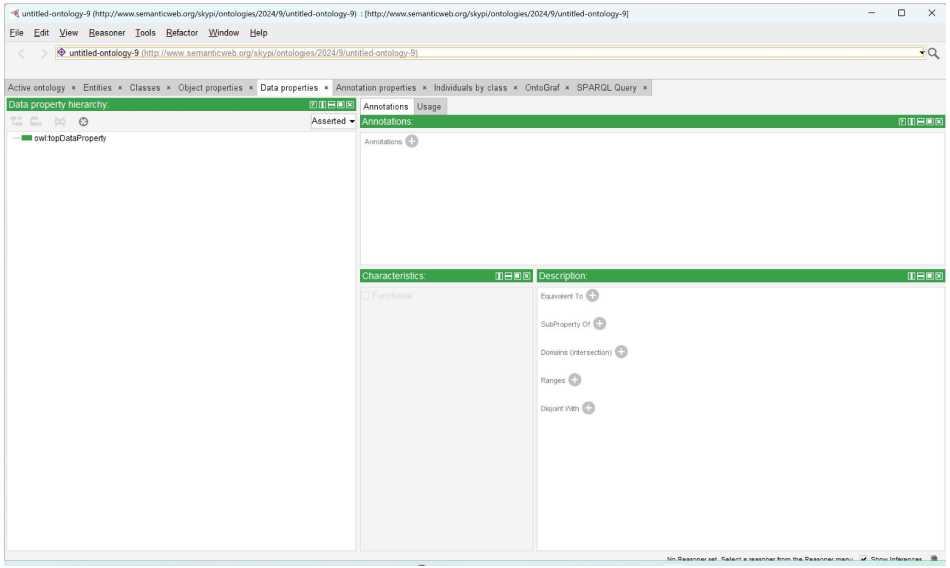
Object properties : 연결정보 작업 환경

- ❖ 오브젝트 프로퍼티 작업을 할 수 있는 곳이다.
- ❖ Domain, Range 등의 관계를 서술한다.



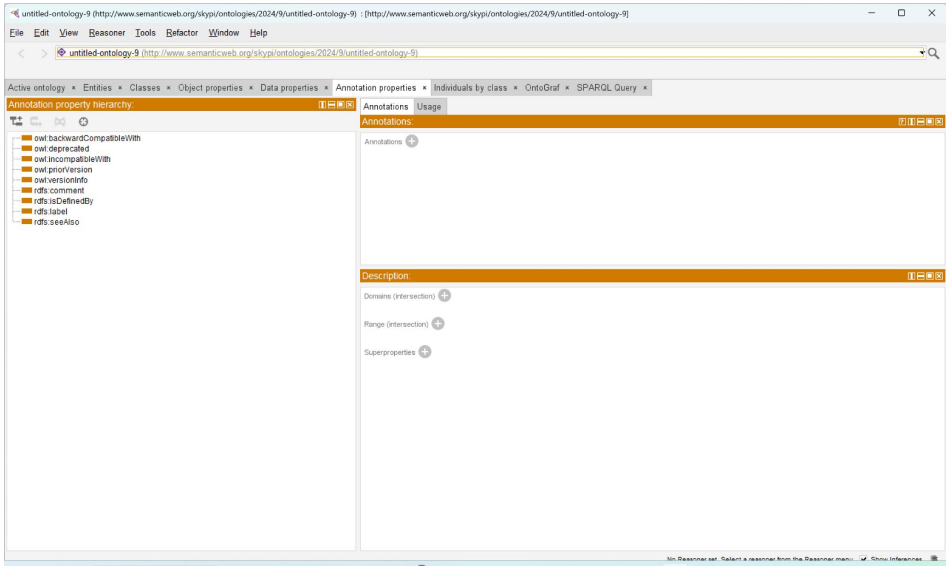
Data properties : 데이터 작업 환경

- 데이터 프로퍼티 작업을 할 수 있는 곳이다.
- 개체들의 속성을 설정한다.



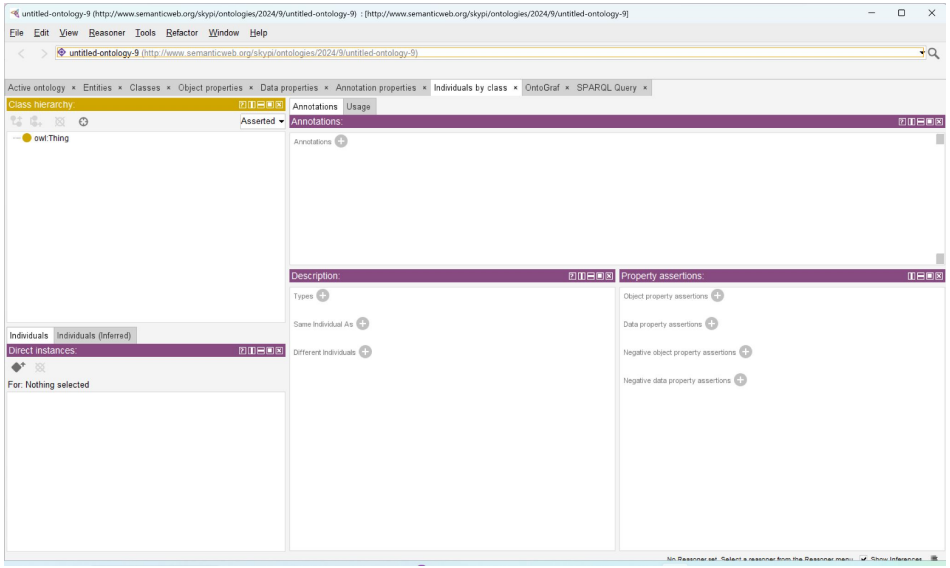
Annotation properties : 설명 정보 작업 환경

❖ 주석과 관련한 정보를 관리하는 곳이다.



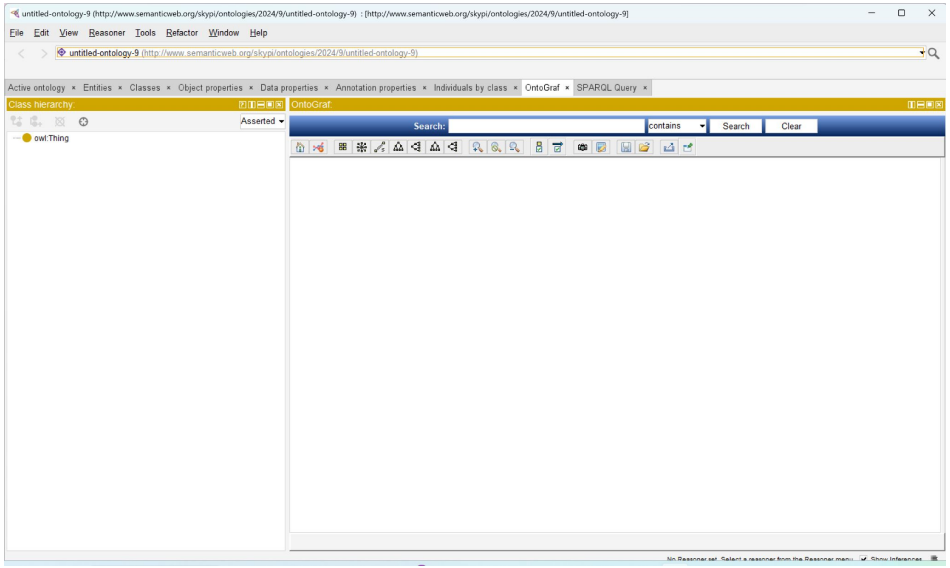
Individuals by class : 개체 작업 환경

❖ 정보화 하고자 하는 지식 요소들을 입력한다.



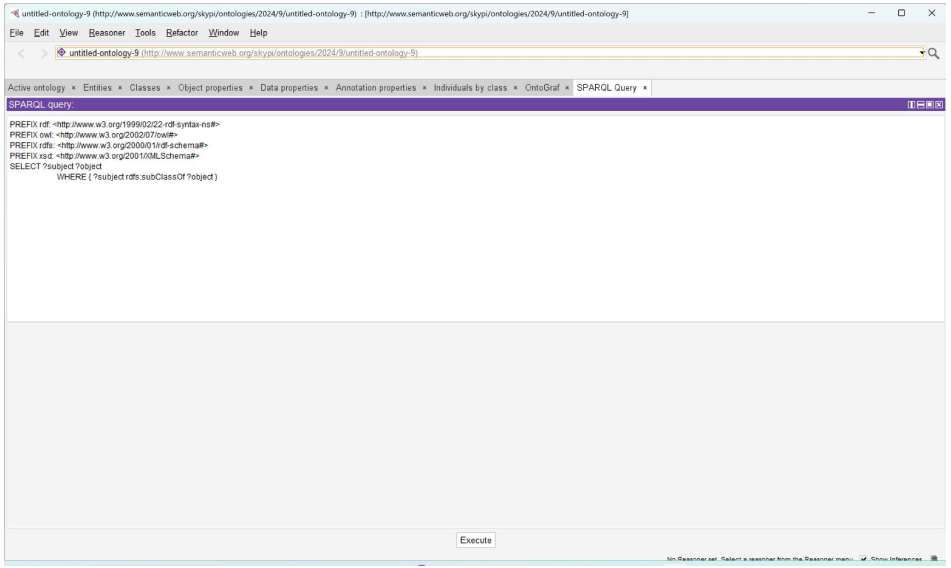
OntoGraf : 시각화

- ❖ 온톨로지 설계 내용을 시각적인 화면으로 확인할 수 있다.
- ❖ 그래프 모양을 캡쳐해서 논문에 사용하기도 한다.



SPARQL Query : 온톨로지를 위한 질문 방식

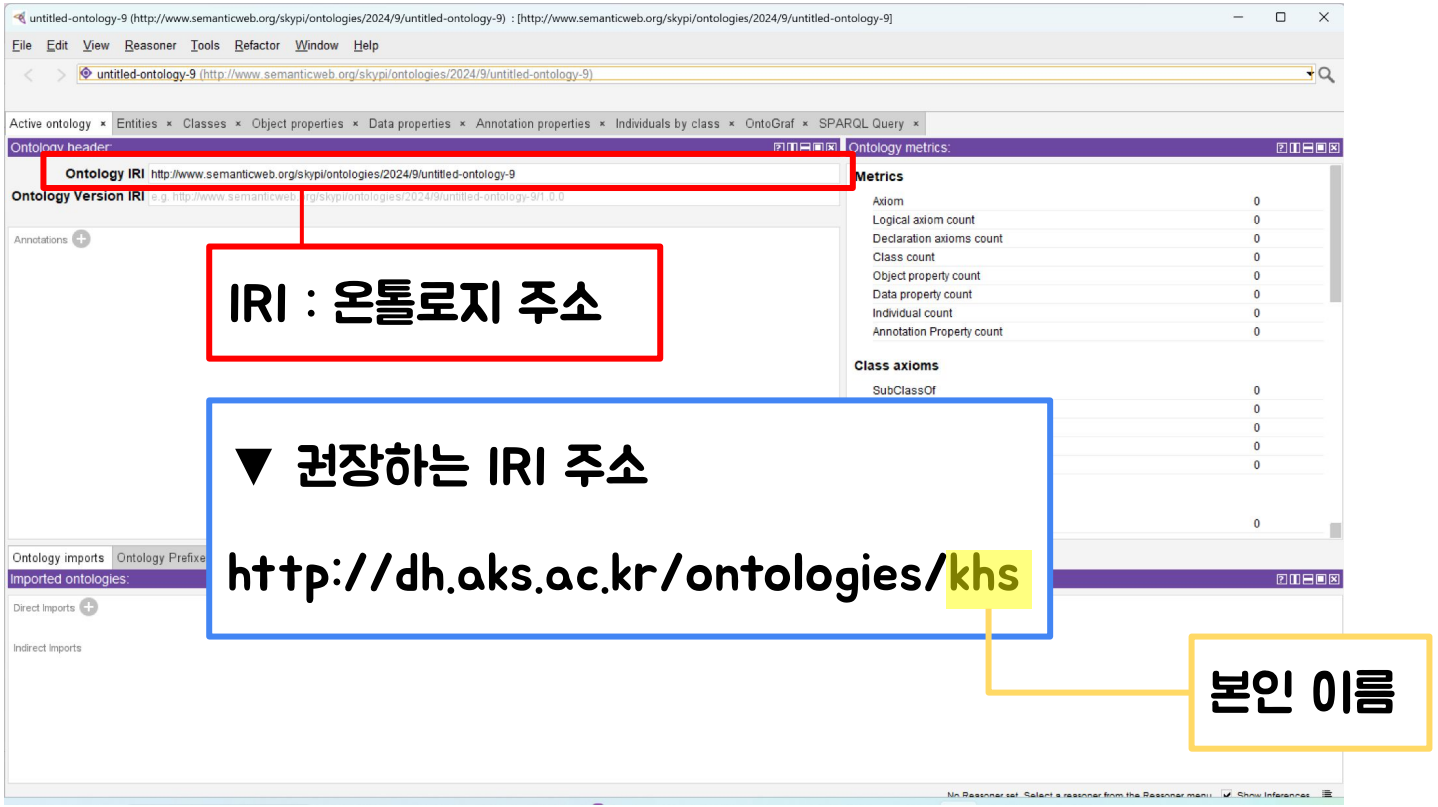
- SPARQL(Simple Protocol and RDF Query Language) : RDF (Resource Description Framework) 형식의 데이터를 탐색할 수 있는 데이터베이스 질의어.



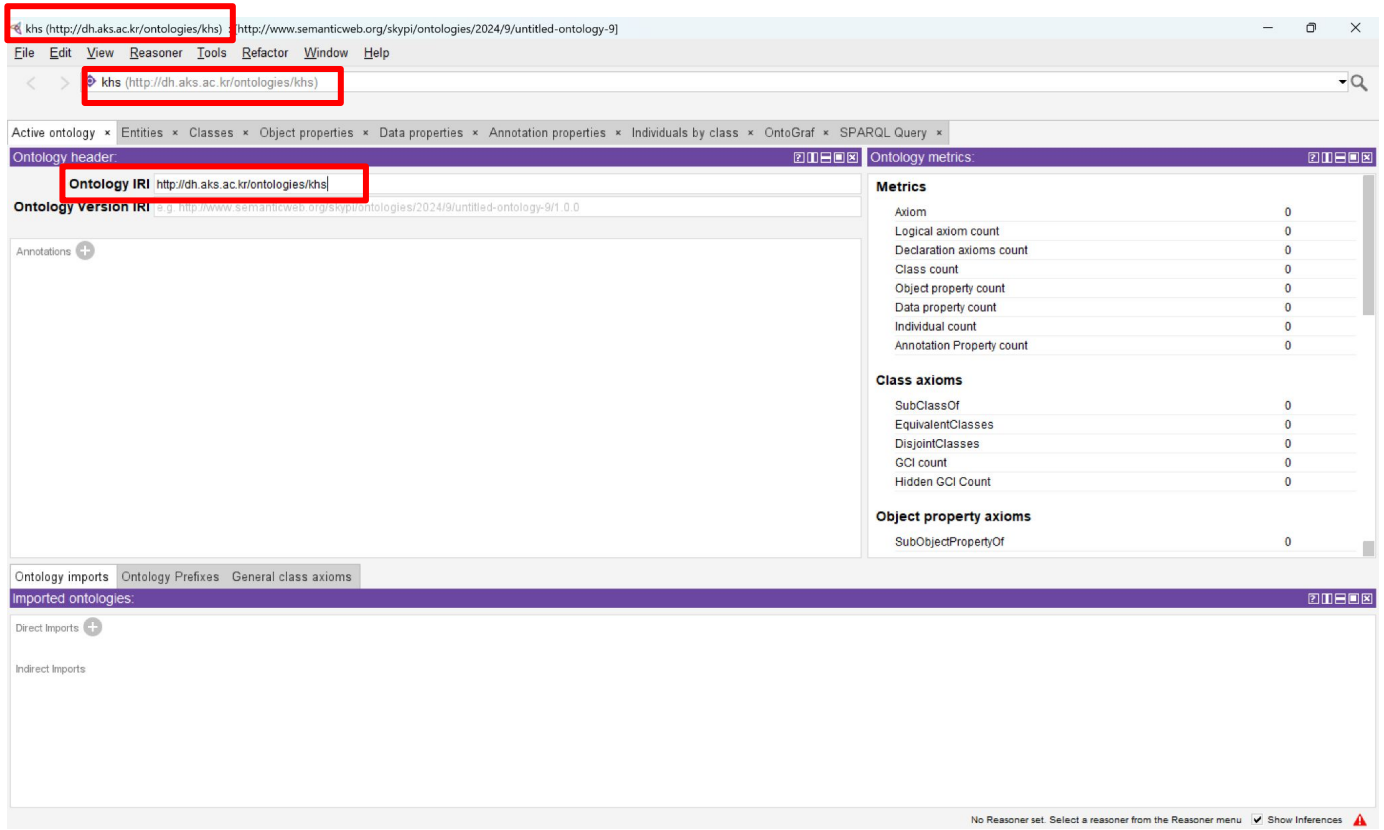
3

프로테제 실습 - Active Ontology

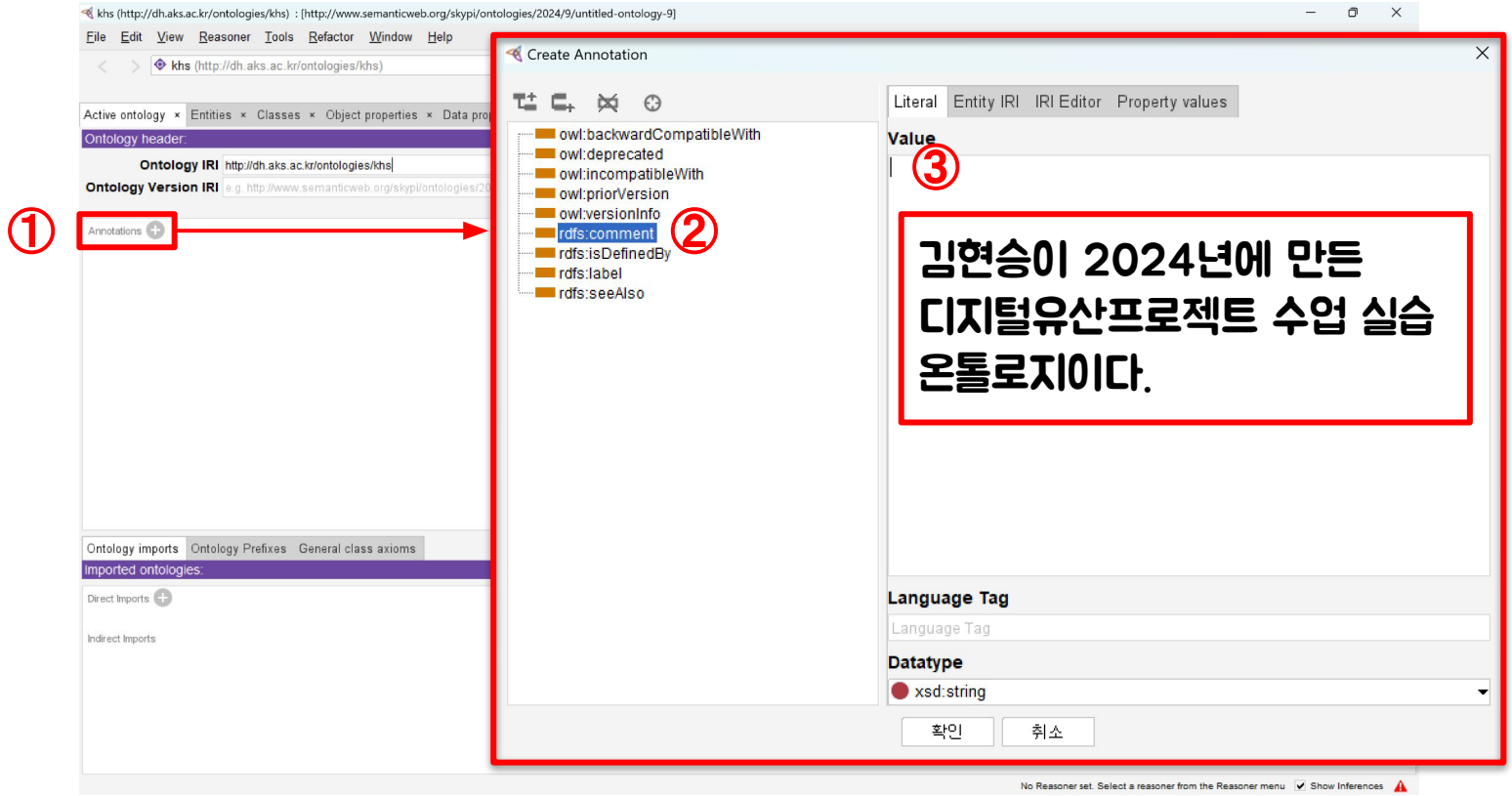
Active Ontology : IRI 입력



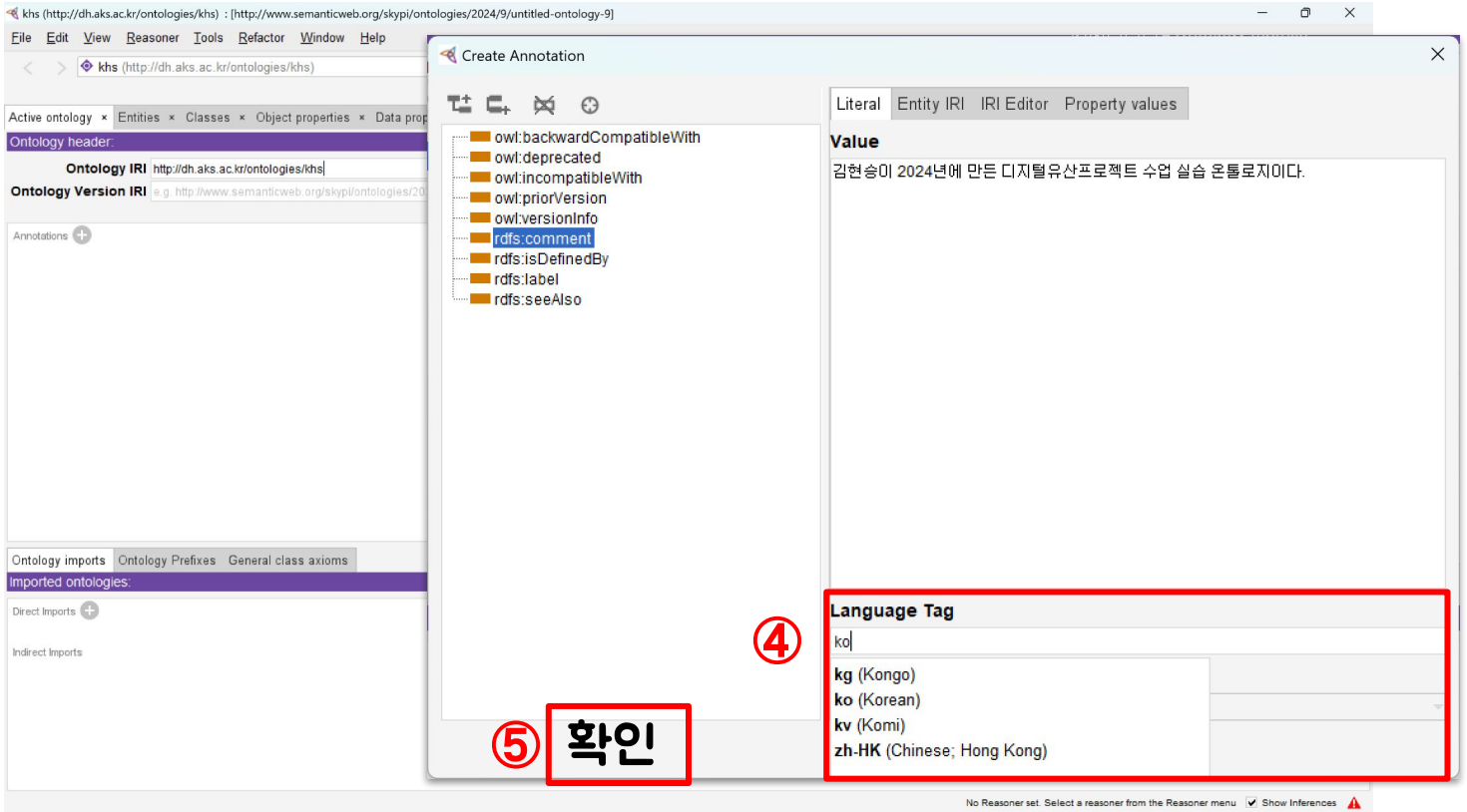
Active Ontology : 수정된 IRI 확인



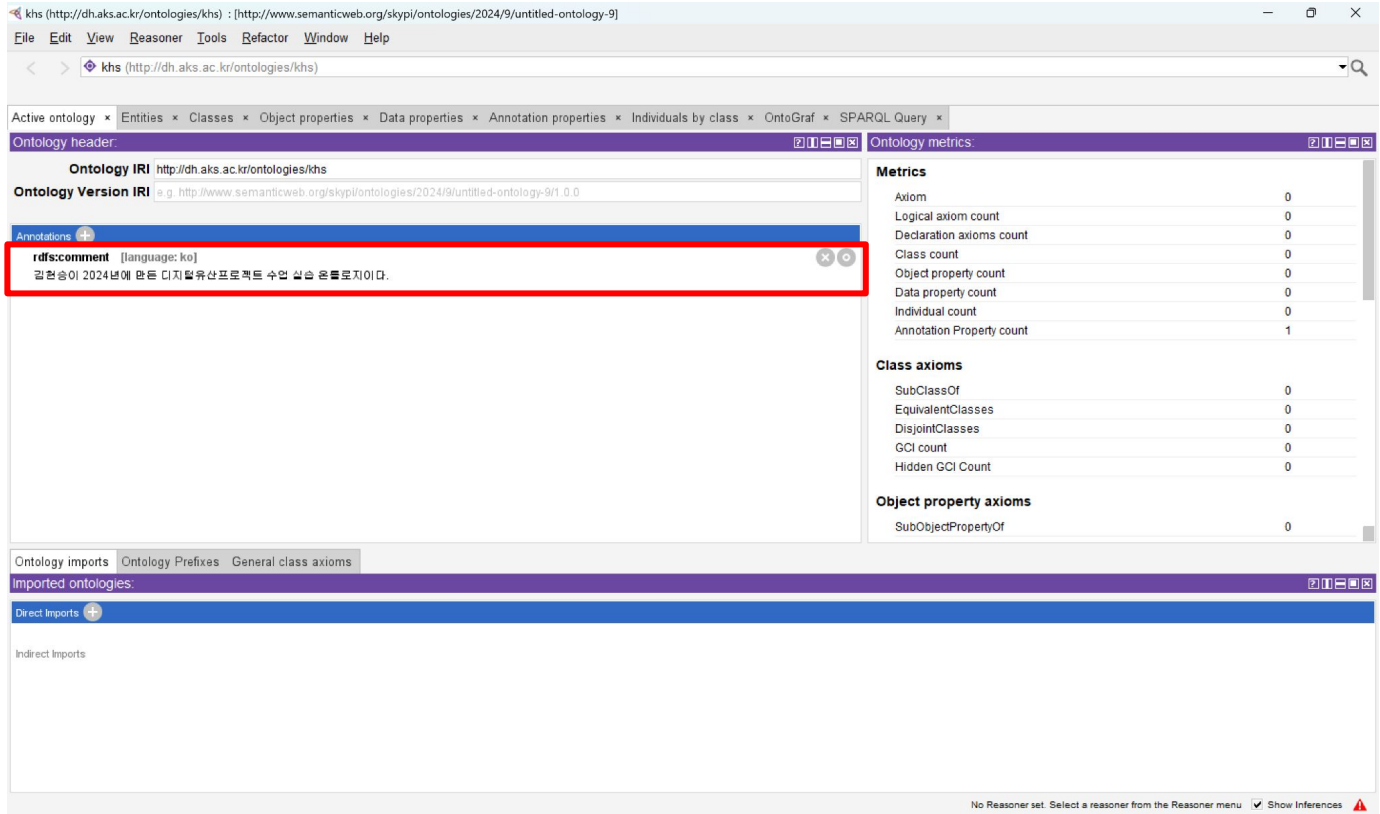
Active Ontology : Annotations 입력



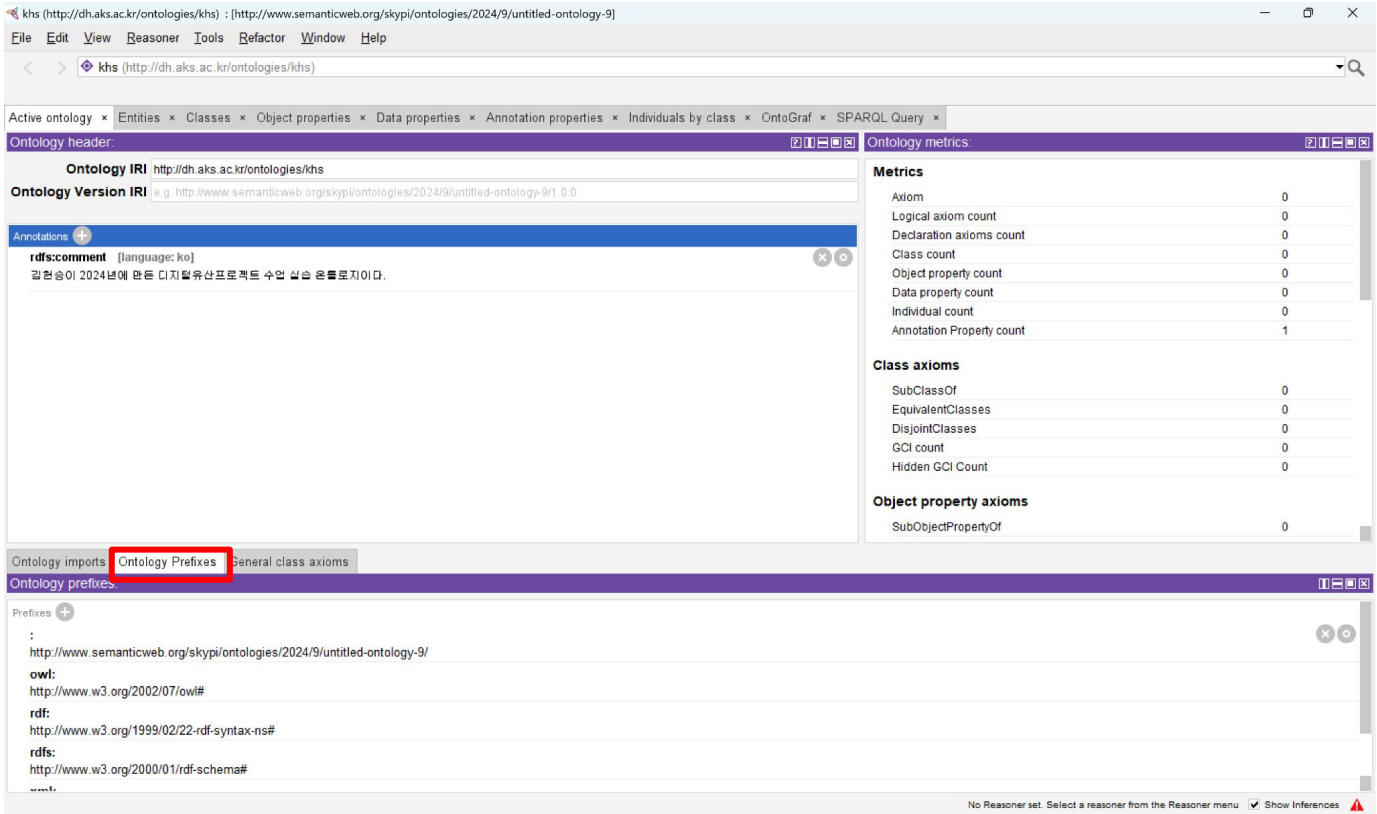
Active Ontology : Annotations 입력



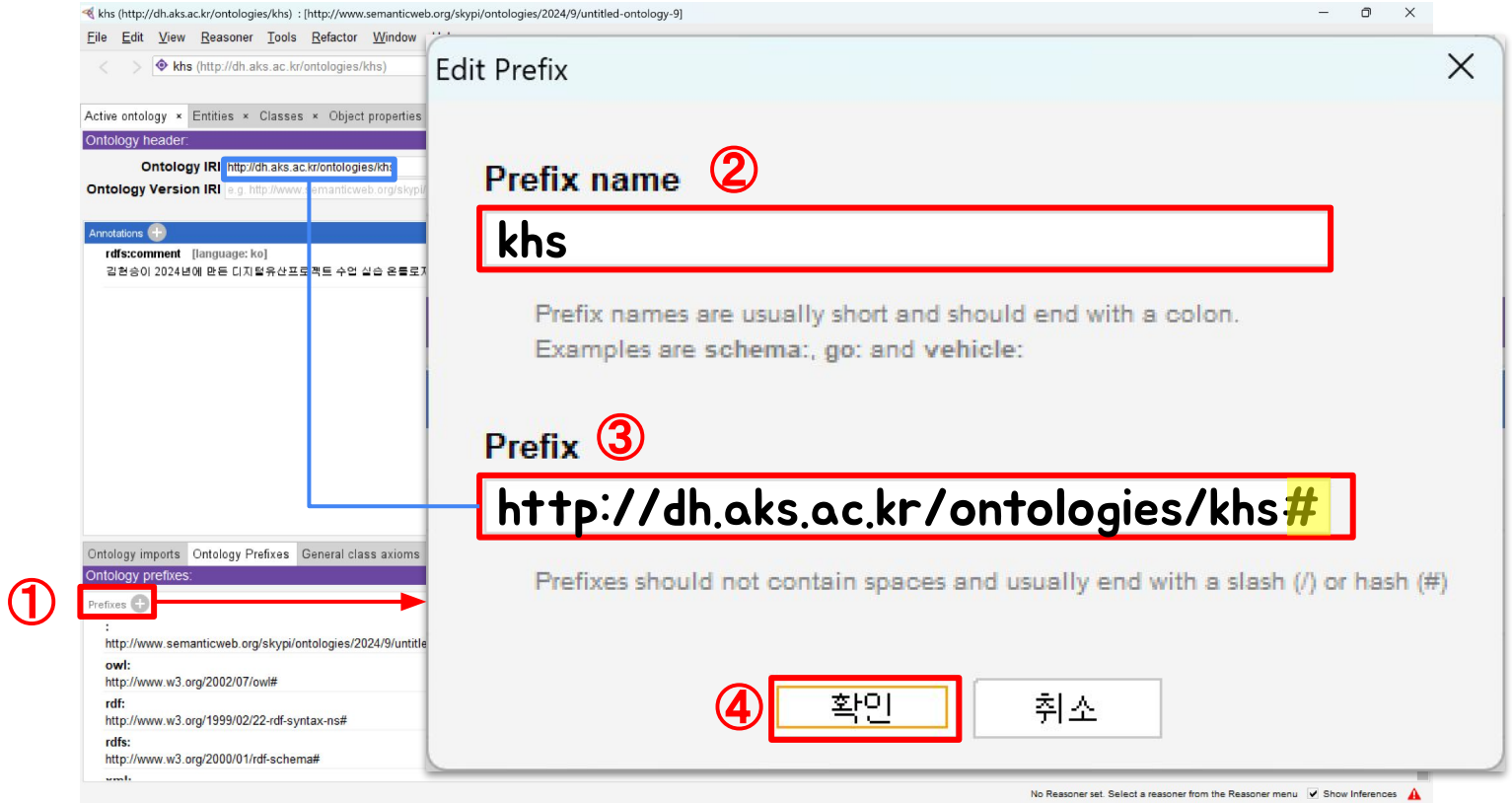
Active Ontology : Annotations 입력



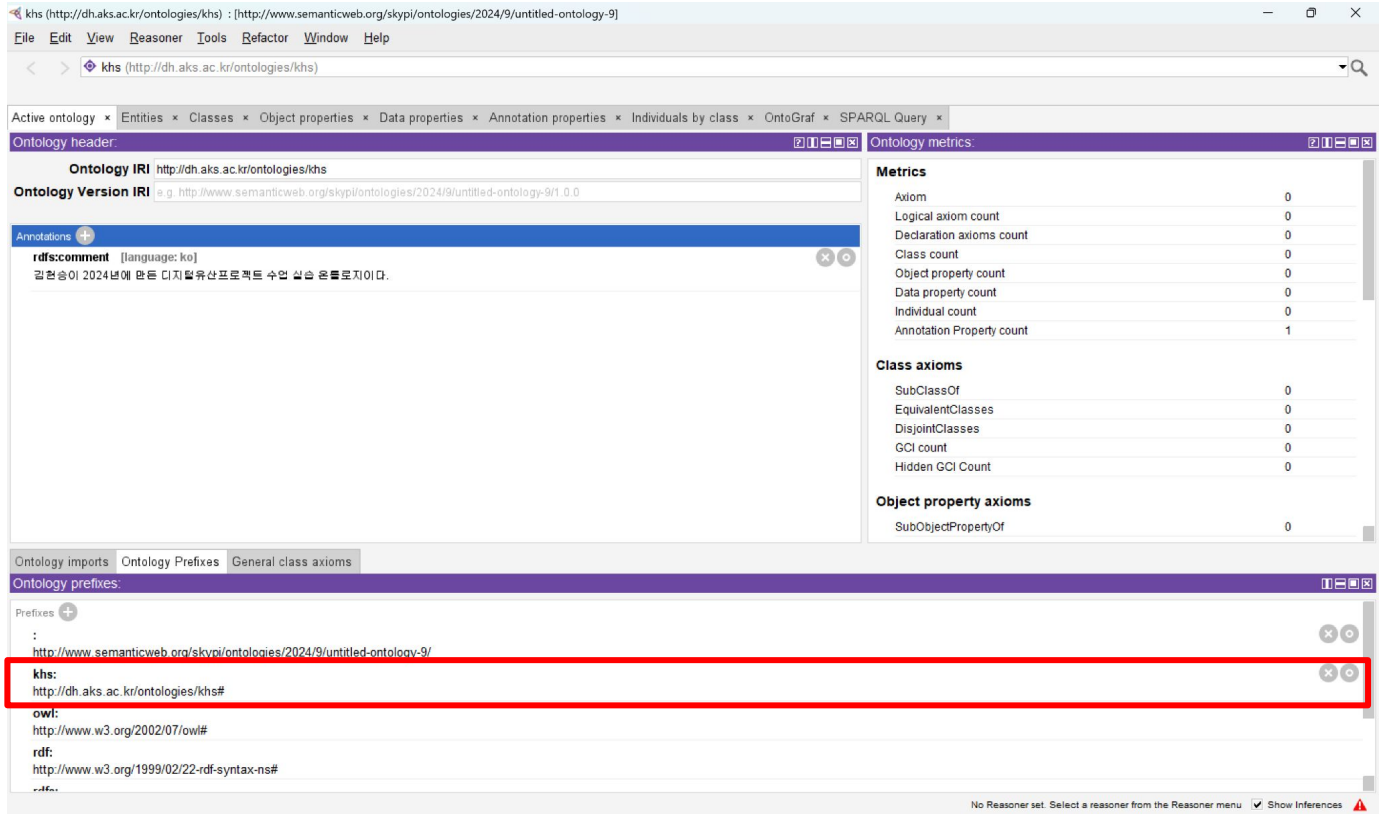
Active Ontology : Ontology Prefixes 추가



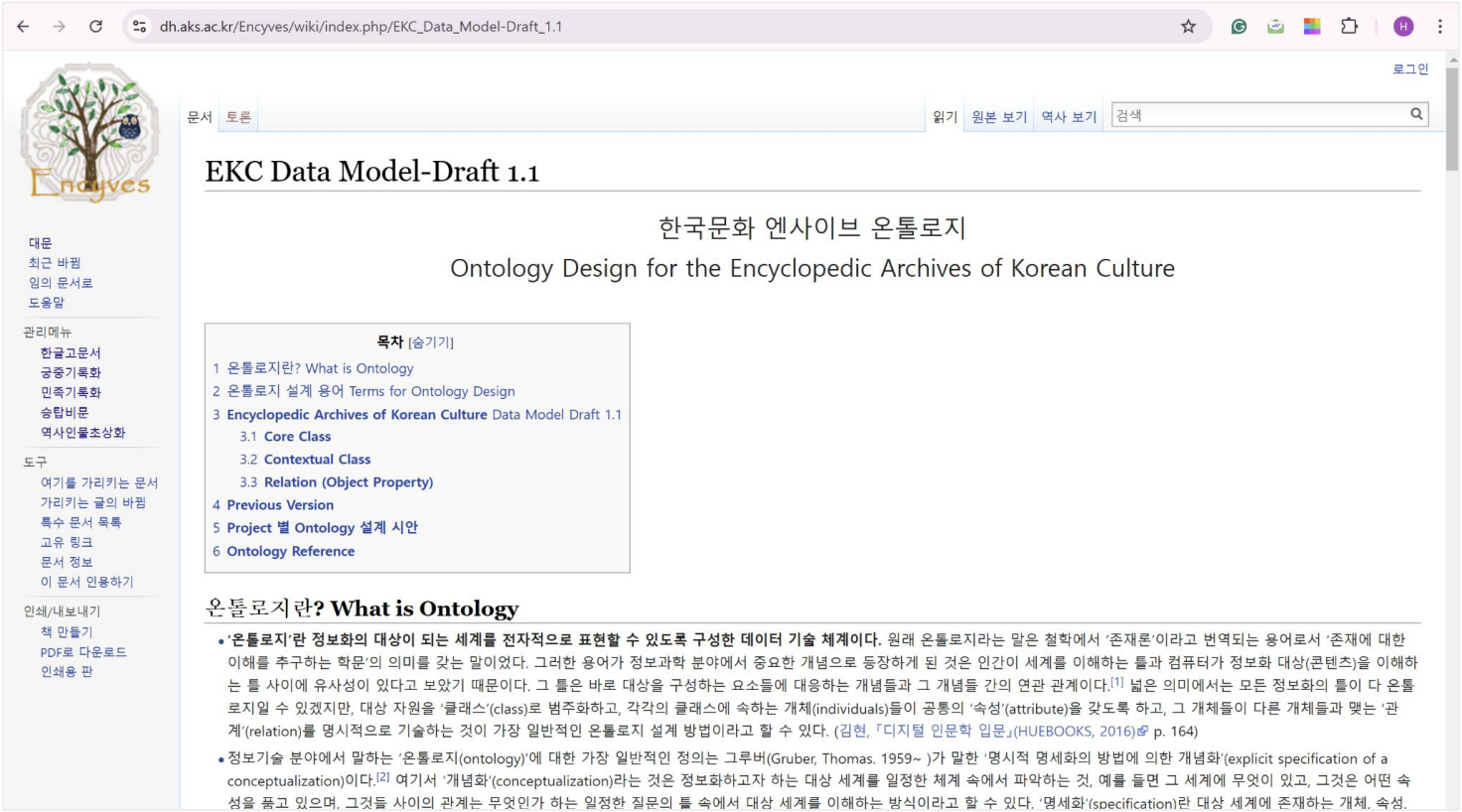
Active Ontology : Ontology Prefixes 추가 (khs)



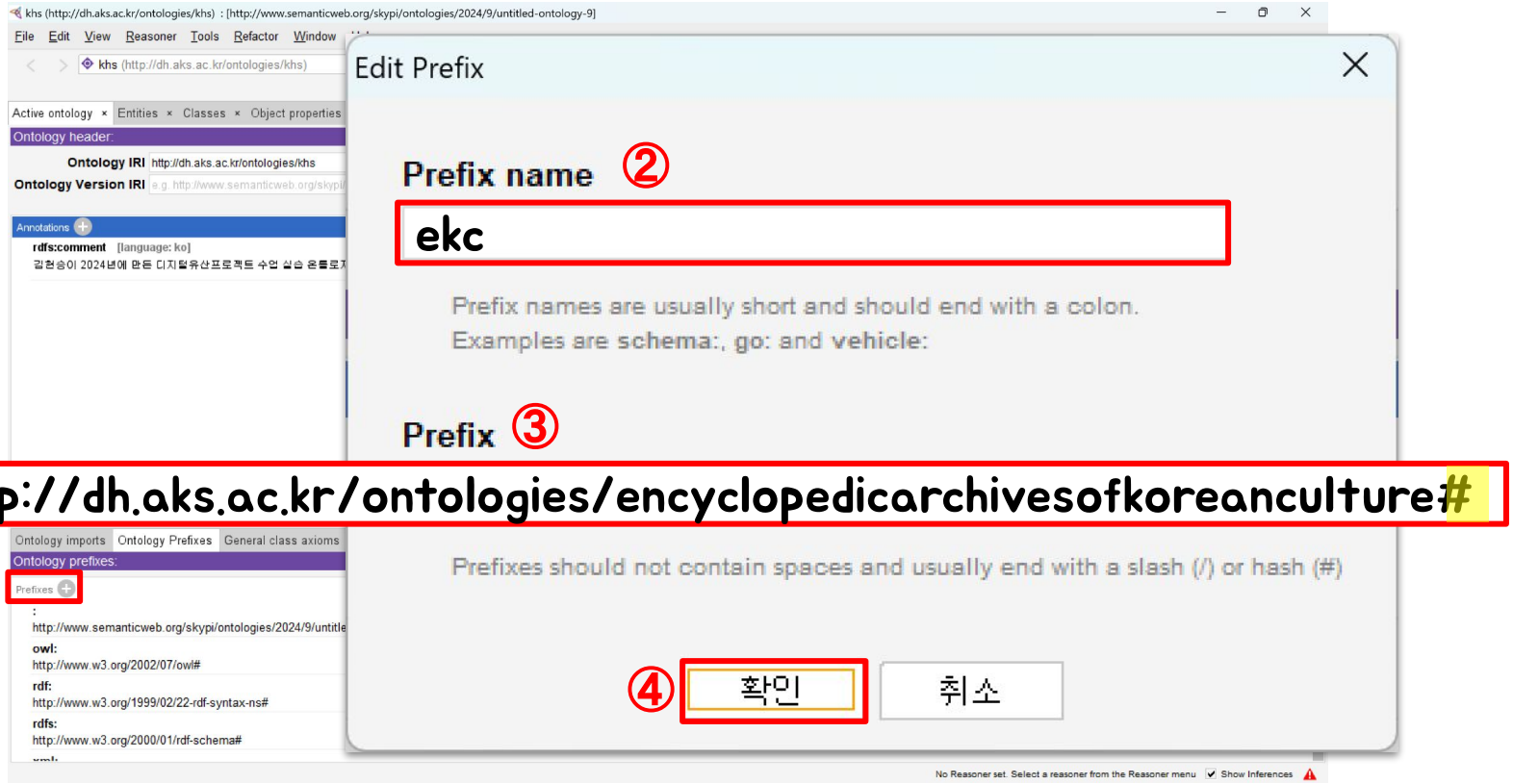
Active Ontology : Ontology Prefixes 추가 (khs)



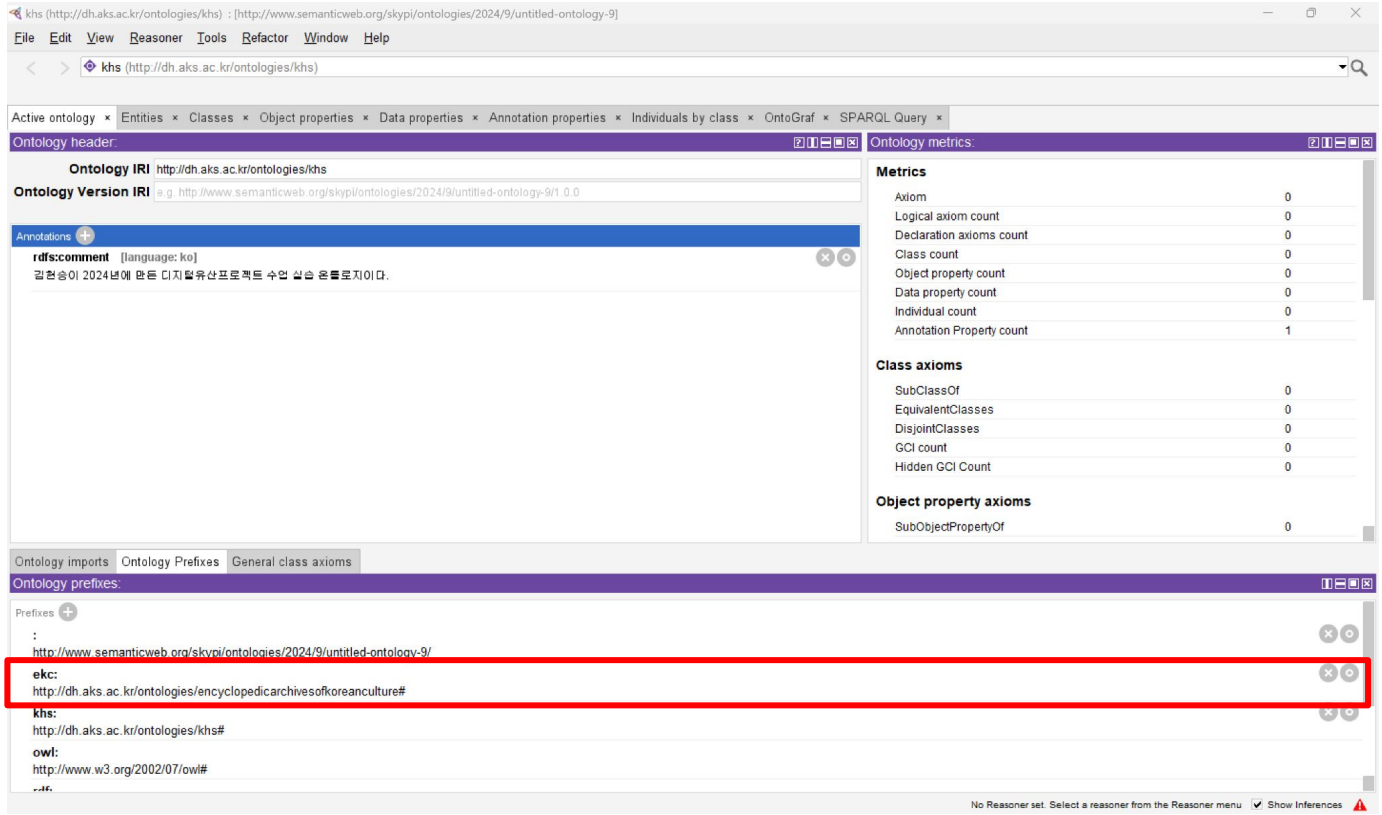
Active Ontology : Ontology Prefixes 추가 (ekc)



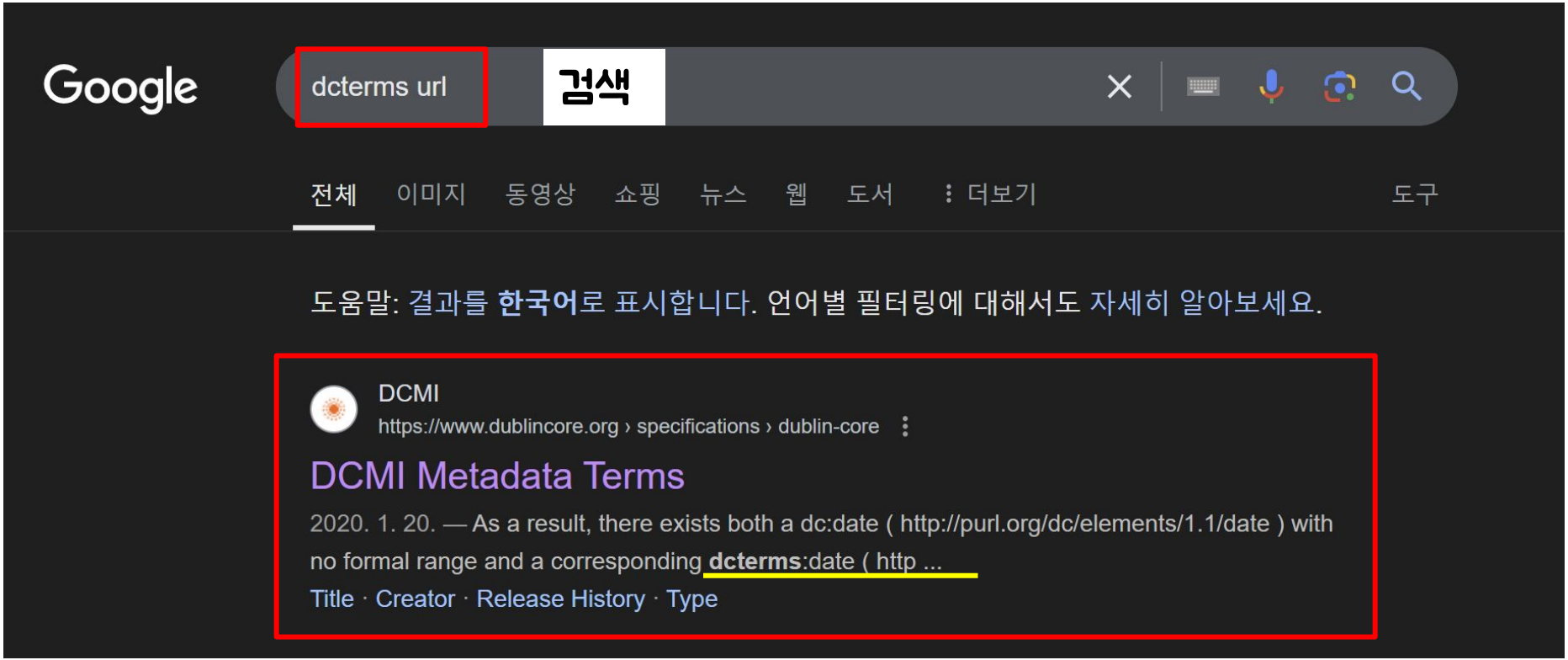
Active Ontology : Ontology Prefixes 추가 (ekc)



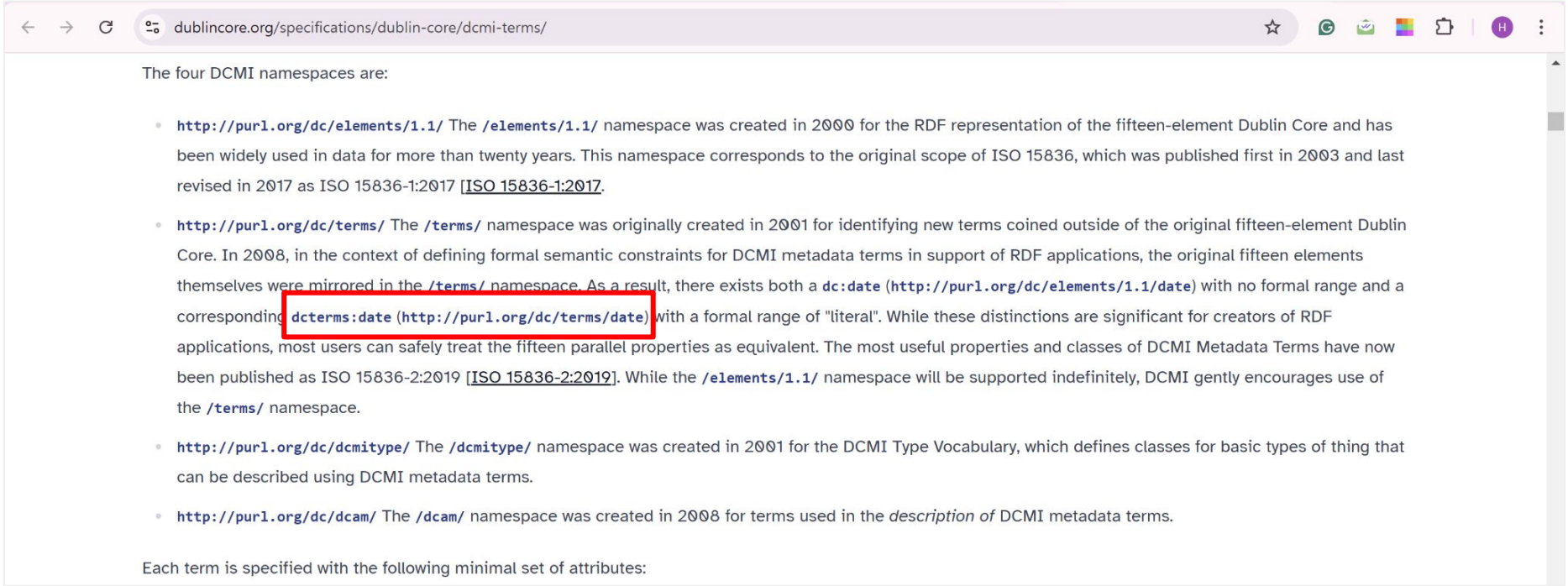
Active Ontology : Ontology Prefixes 추가 (ekc)



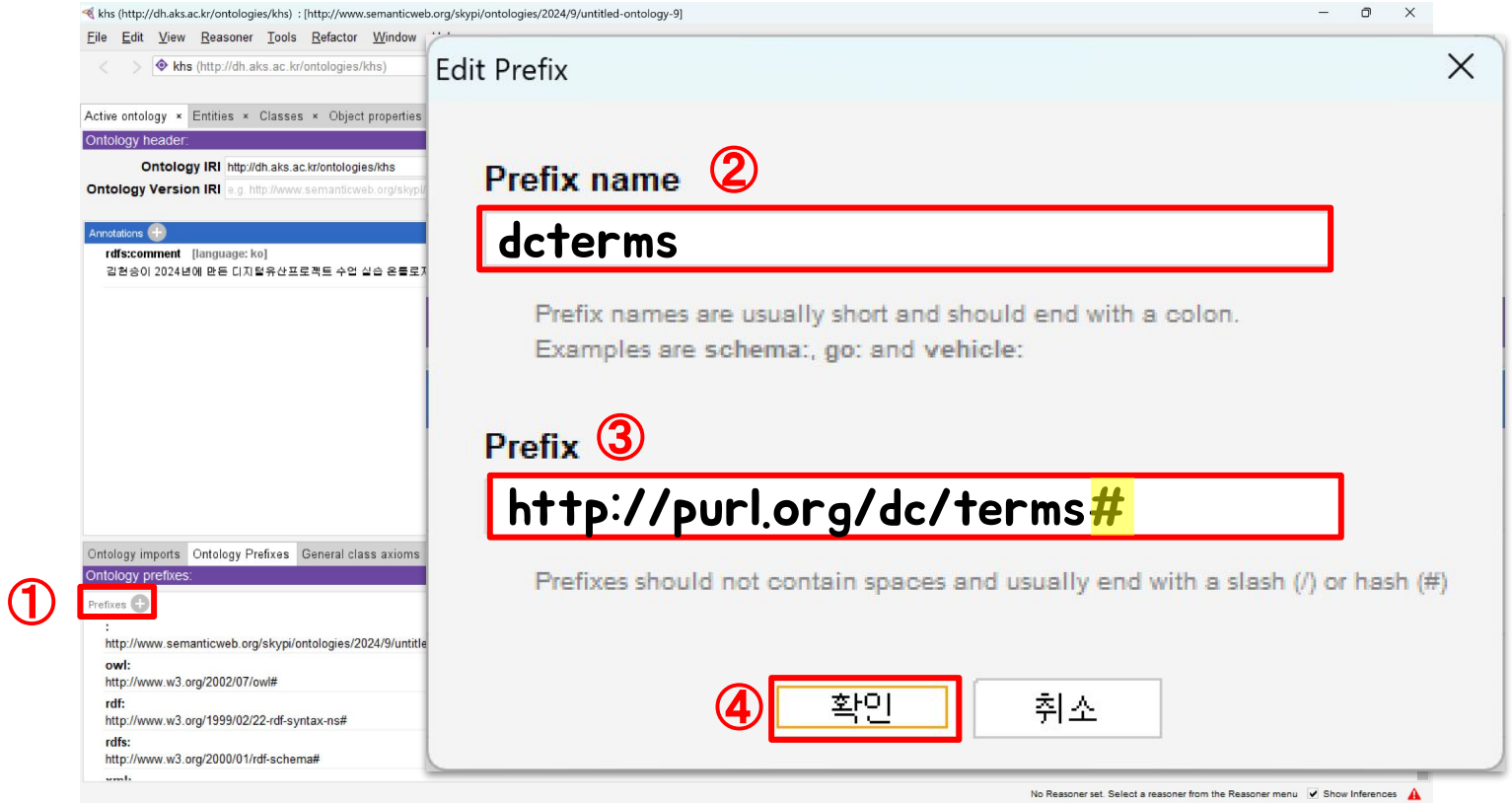
Active Ontology : Ontology Prefixes 추가 (dcterms)



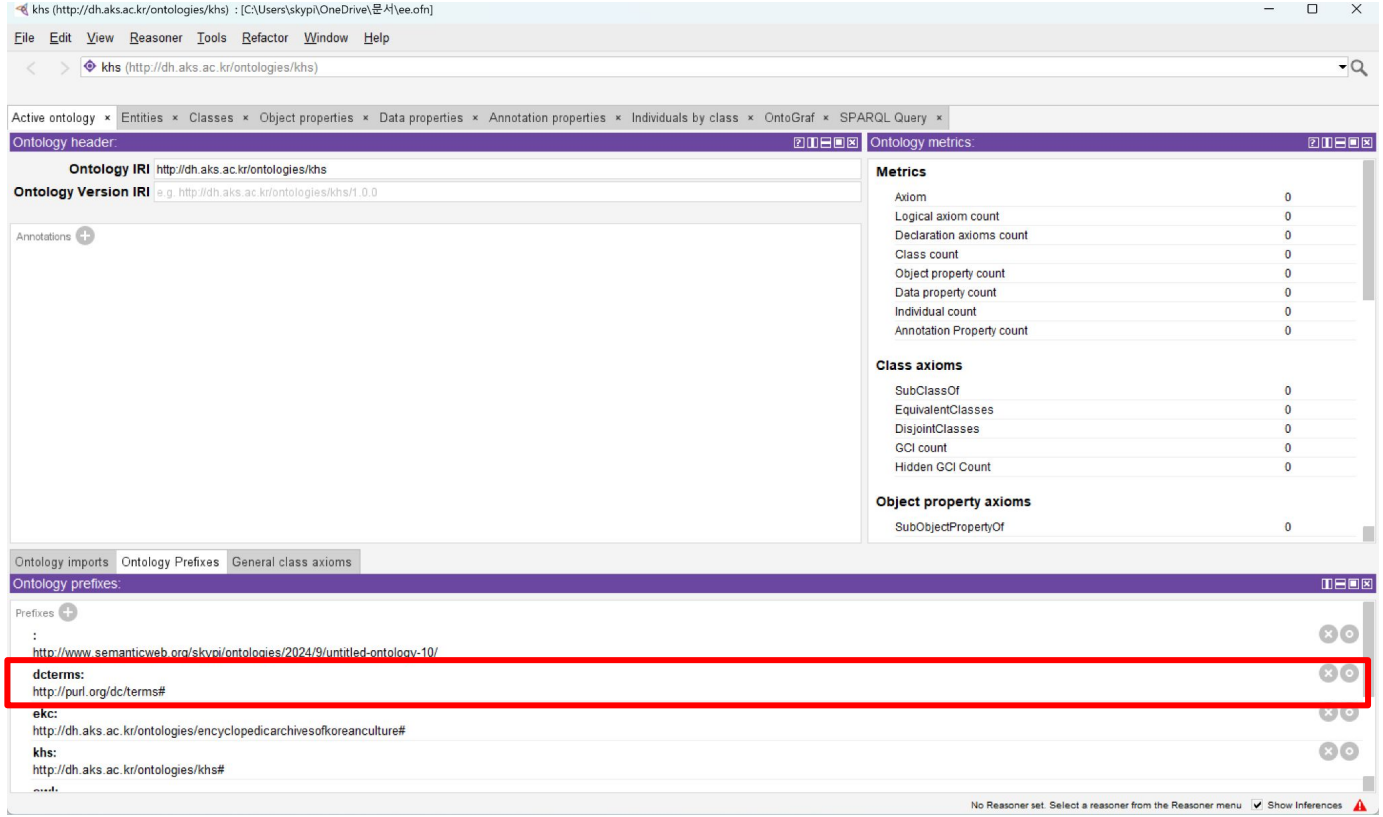
Active Ontology : Ontology Prefixes 추가 (dcterms)



Active Ontology : Ontology Prefixes 추가 (dcterms)



Active Ontology : Ontology Prefixes 추가 (dcterms)

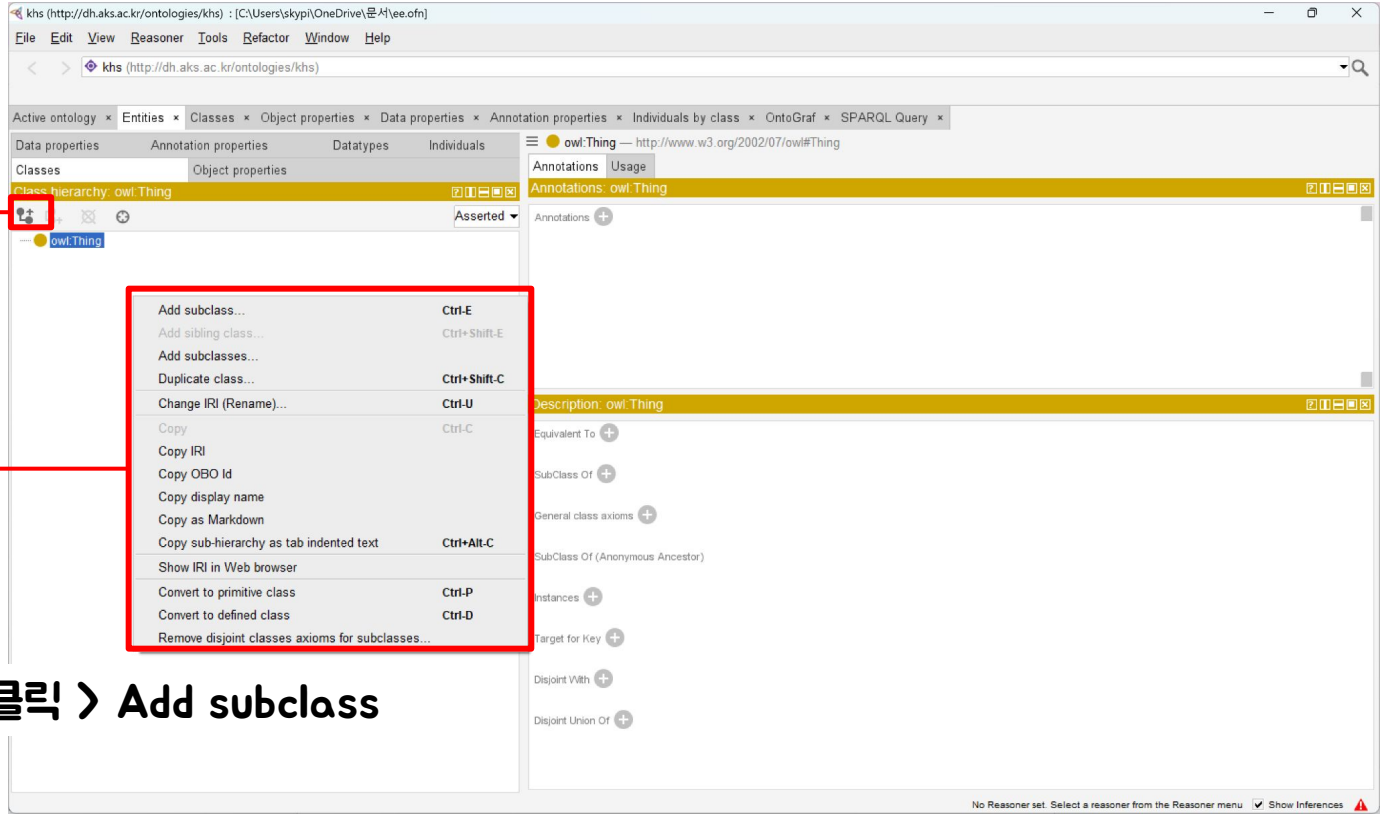


4

프로테제 실습 - Entities

Entities : Sub Class 추가

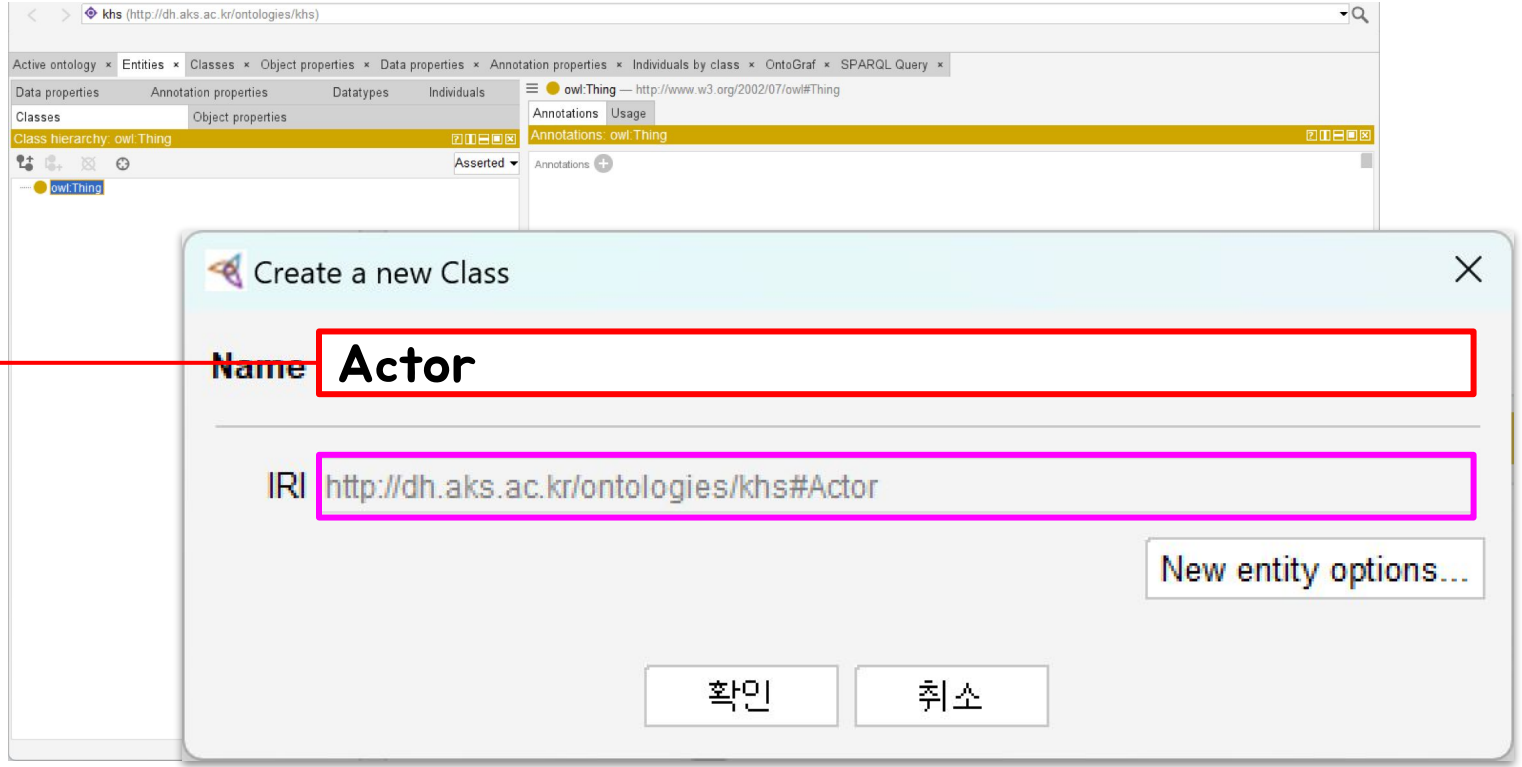
① 클릭



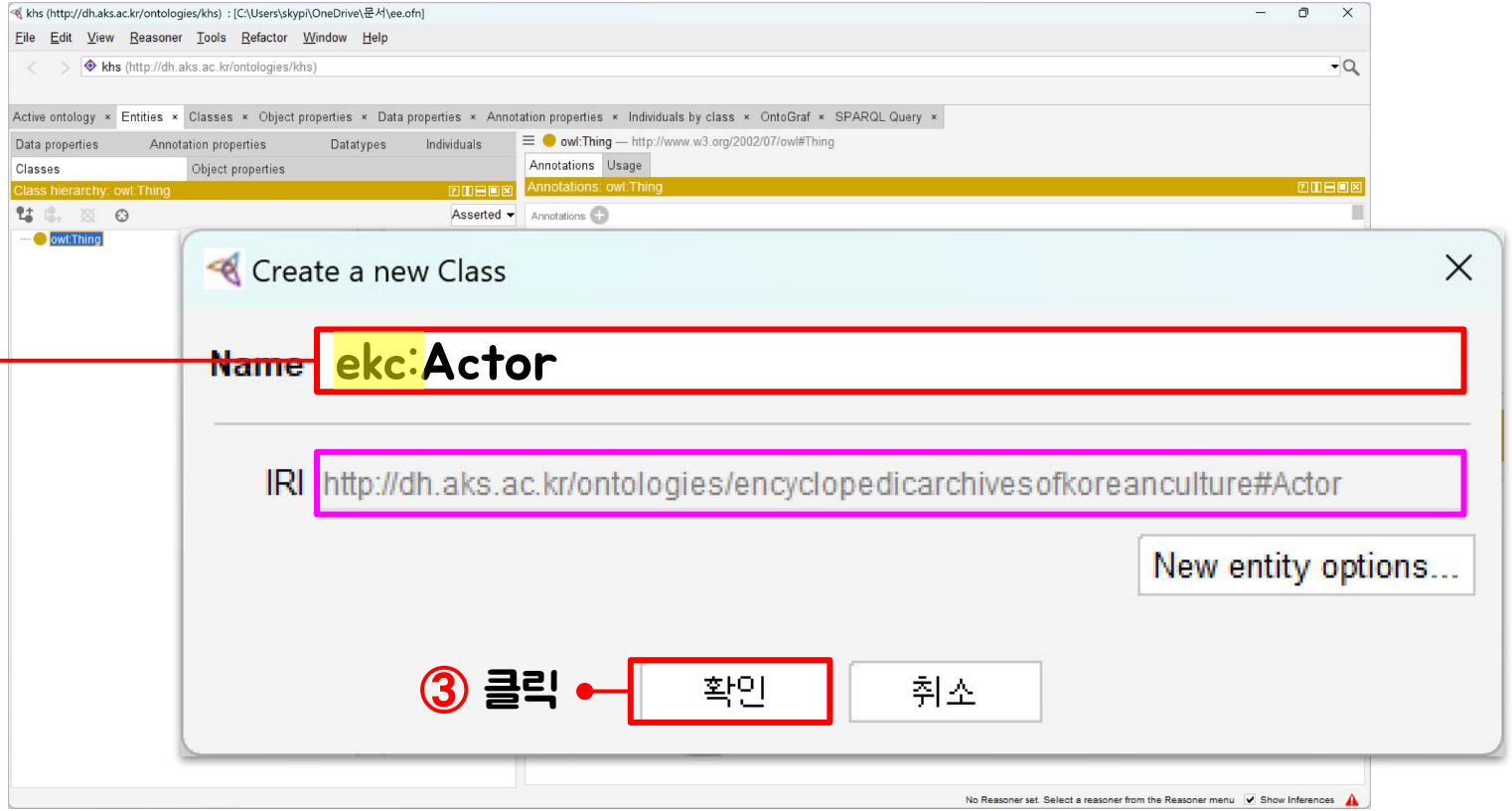
또는 우클릭 > Add subclass

Entities : Sub Class 추가

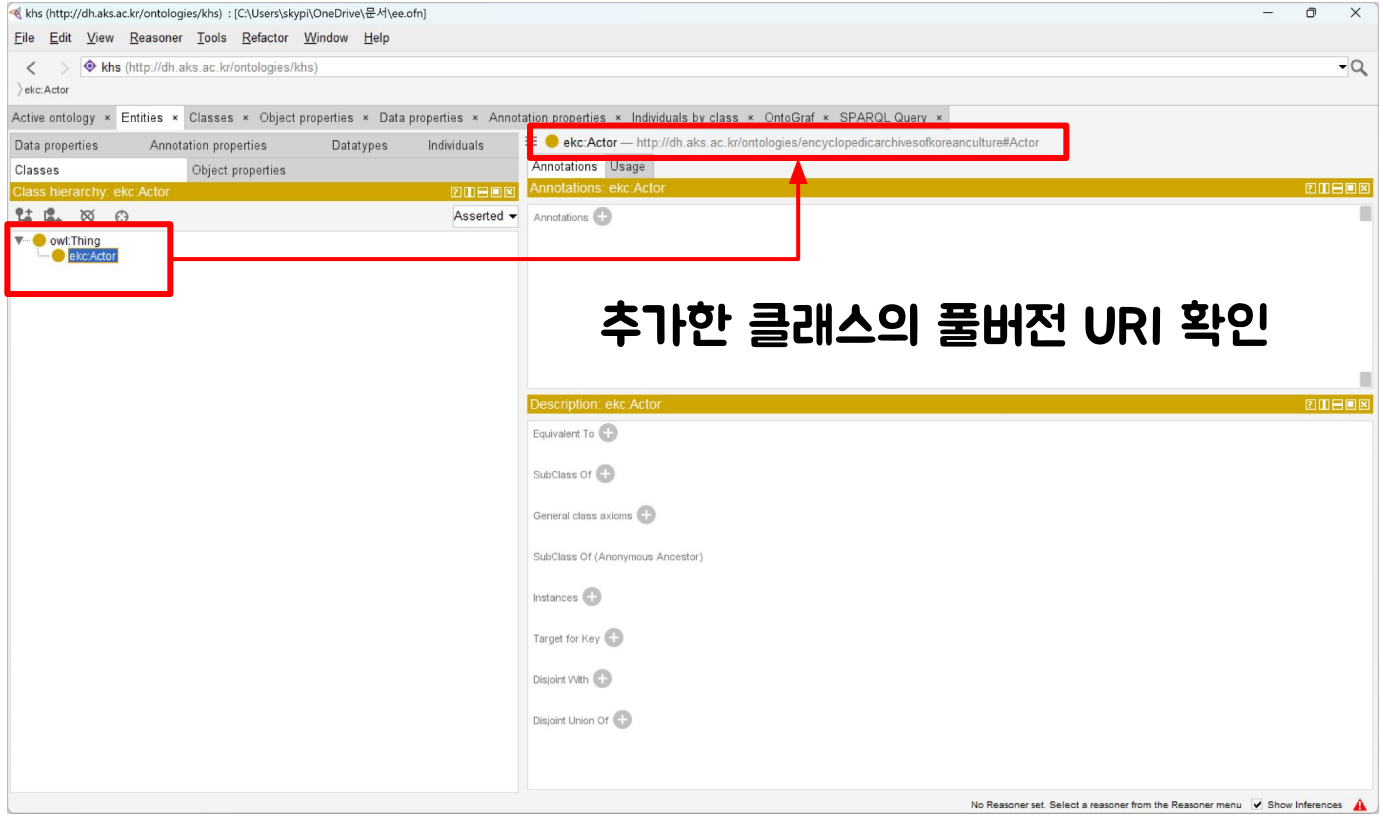
② 입력



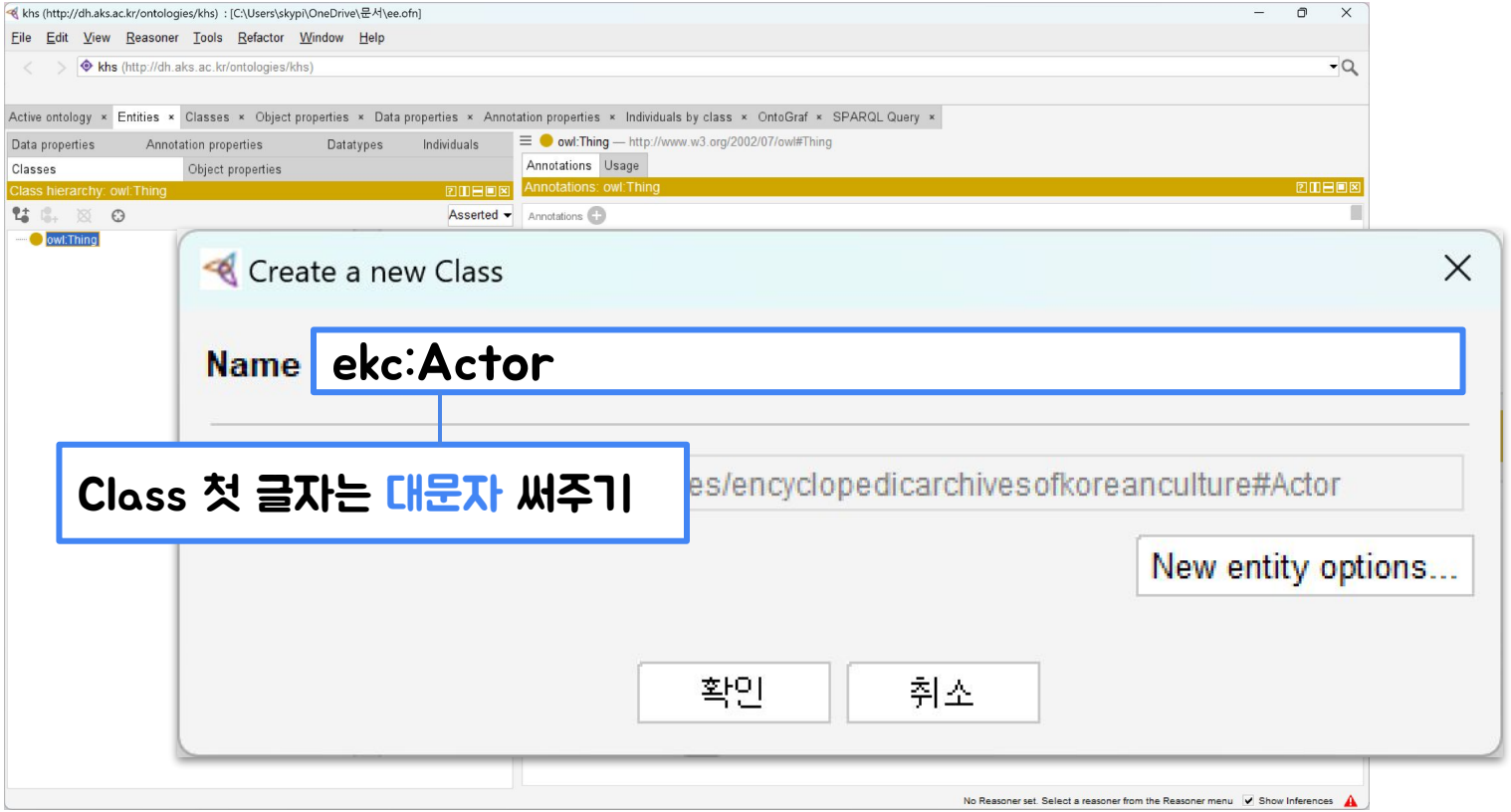
Entities : Sub Class 추가



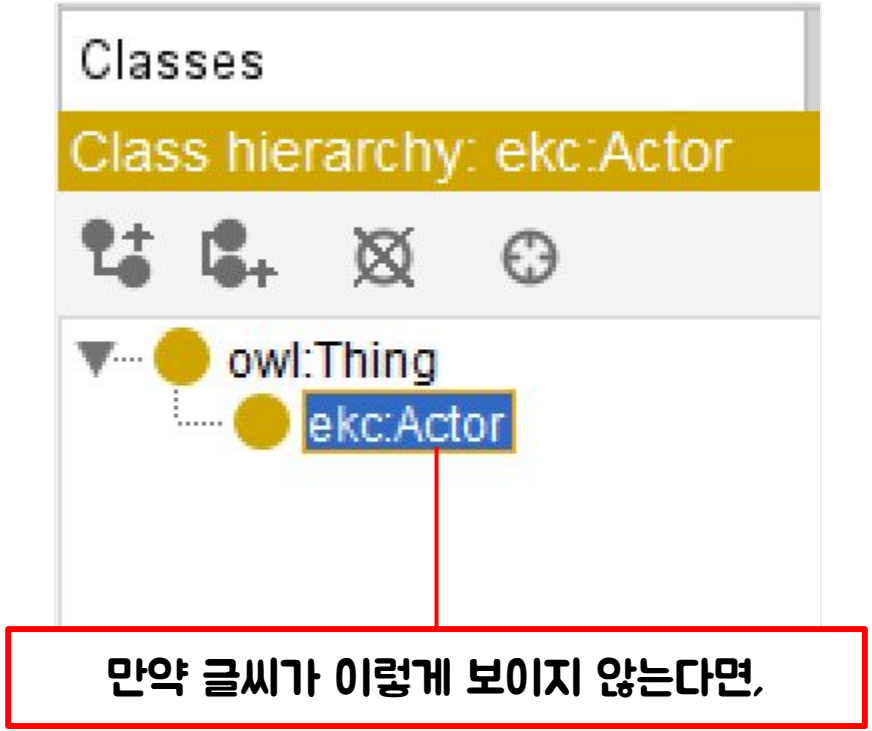
Entities : Sub Class 추가



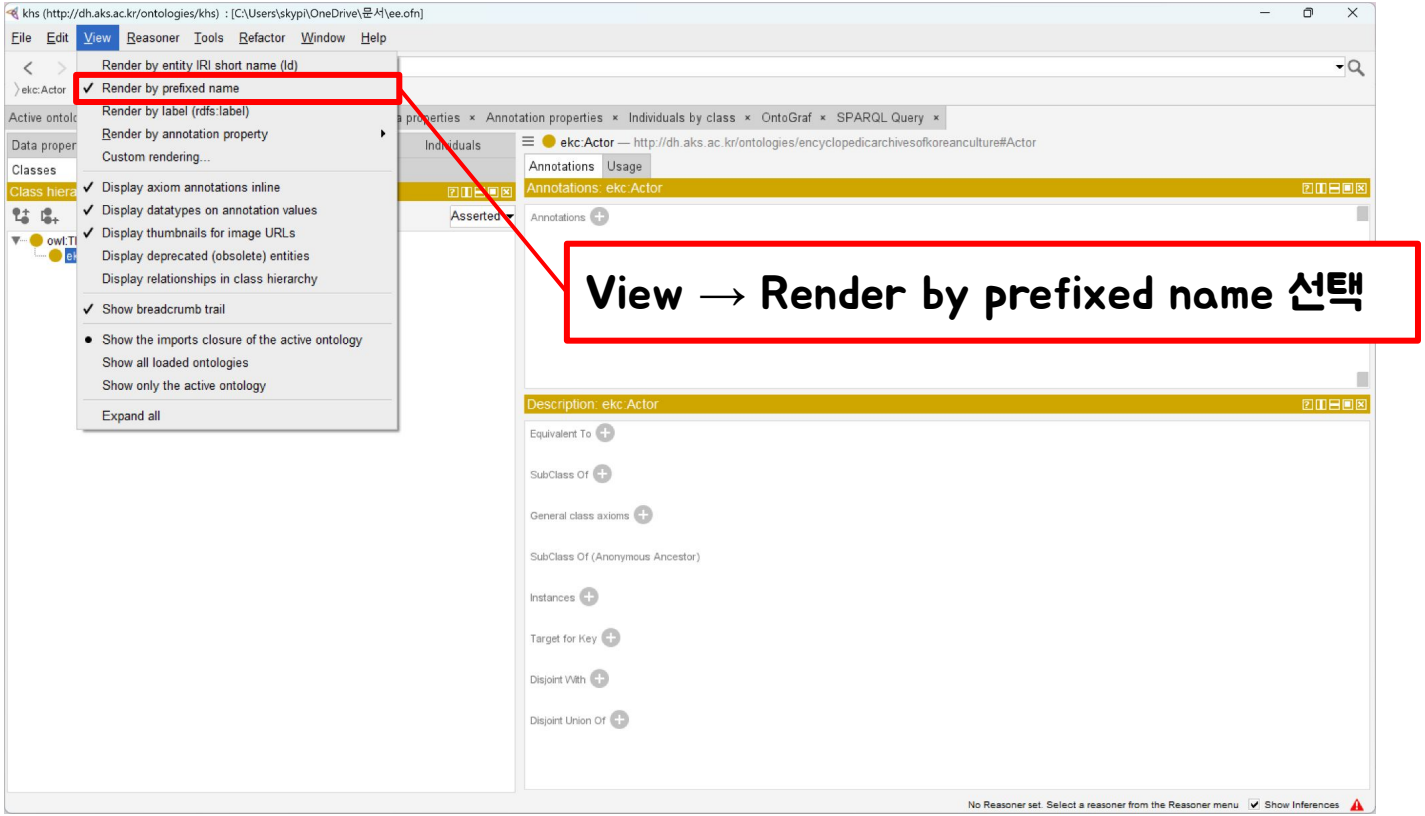
※ Class 규칙


Create a new Class
Name
ekc:Actor
Class 첫 글자는 대문자 써주기
New entity options...
확인
취소

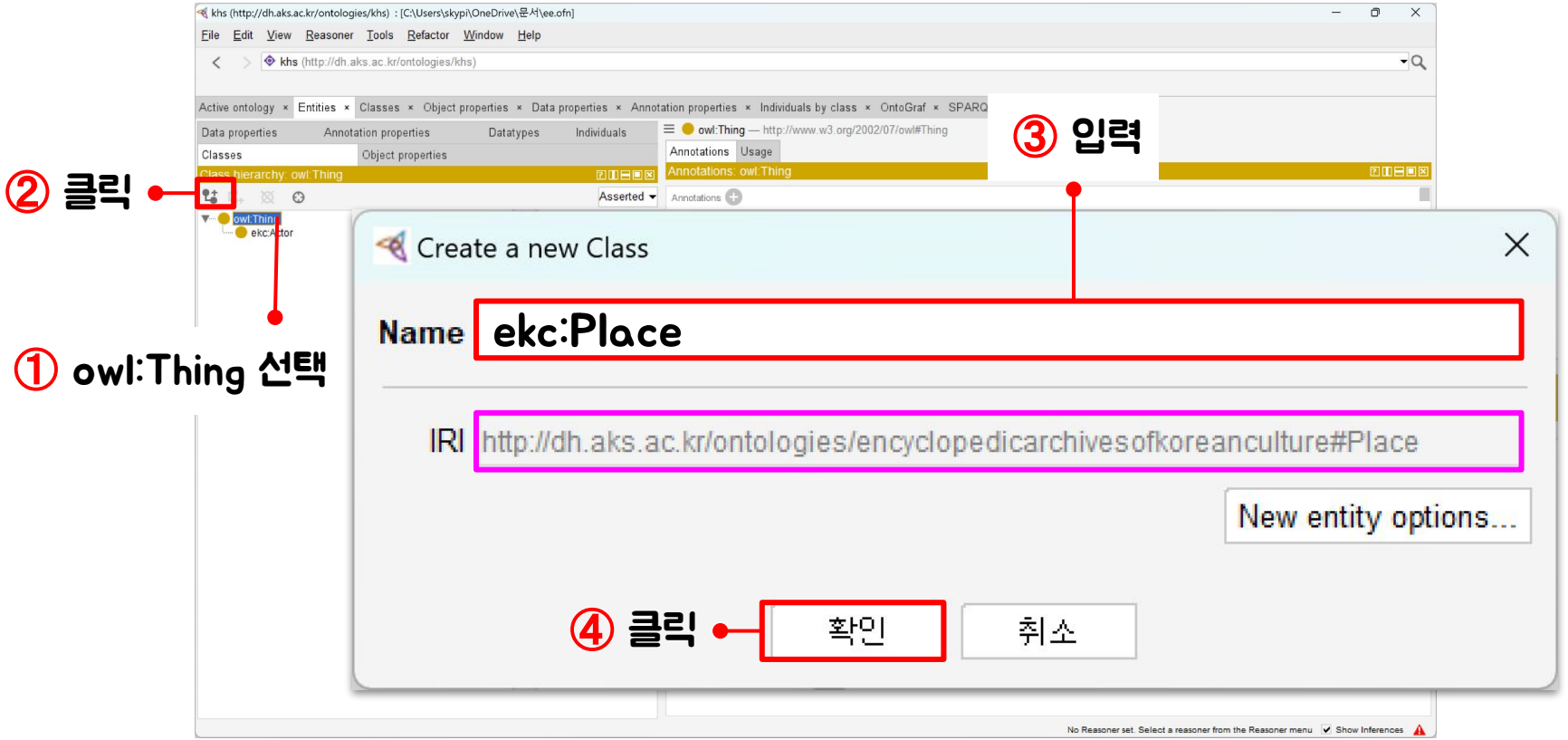
※ View : Render by prefixed name



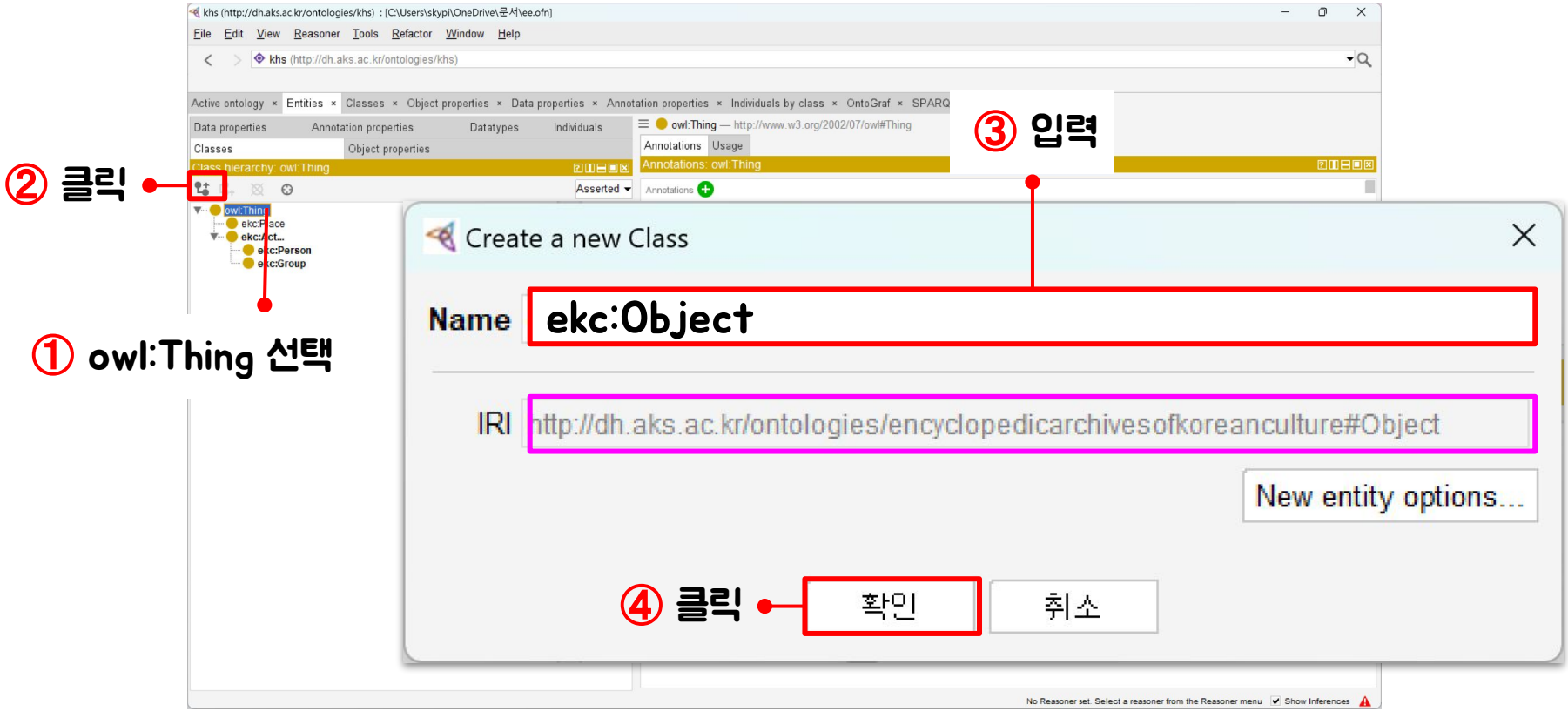
※ View : Render by prefixed name



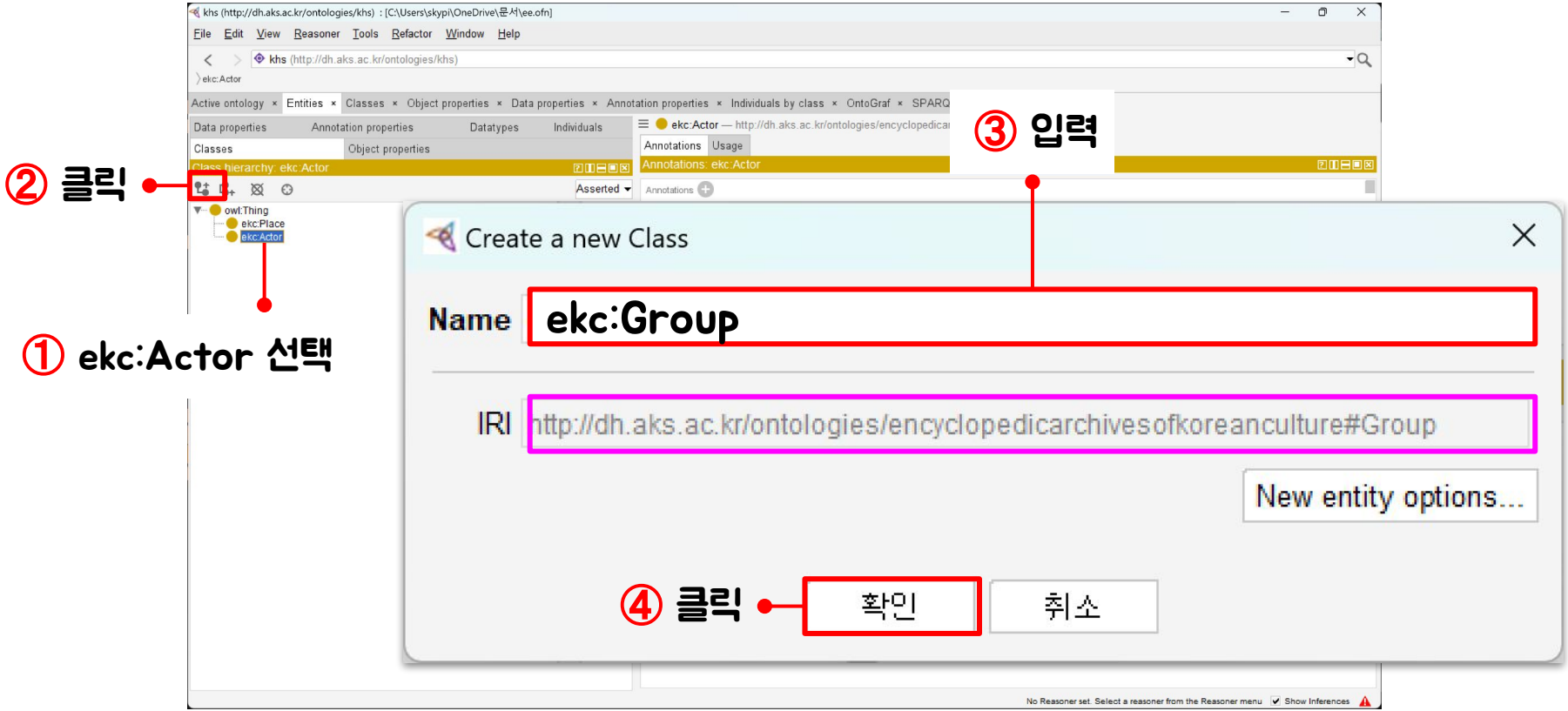
Entities : Sub Class 추가



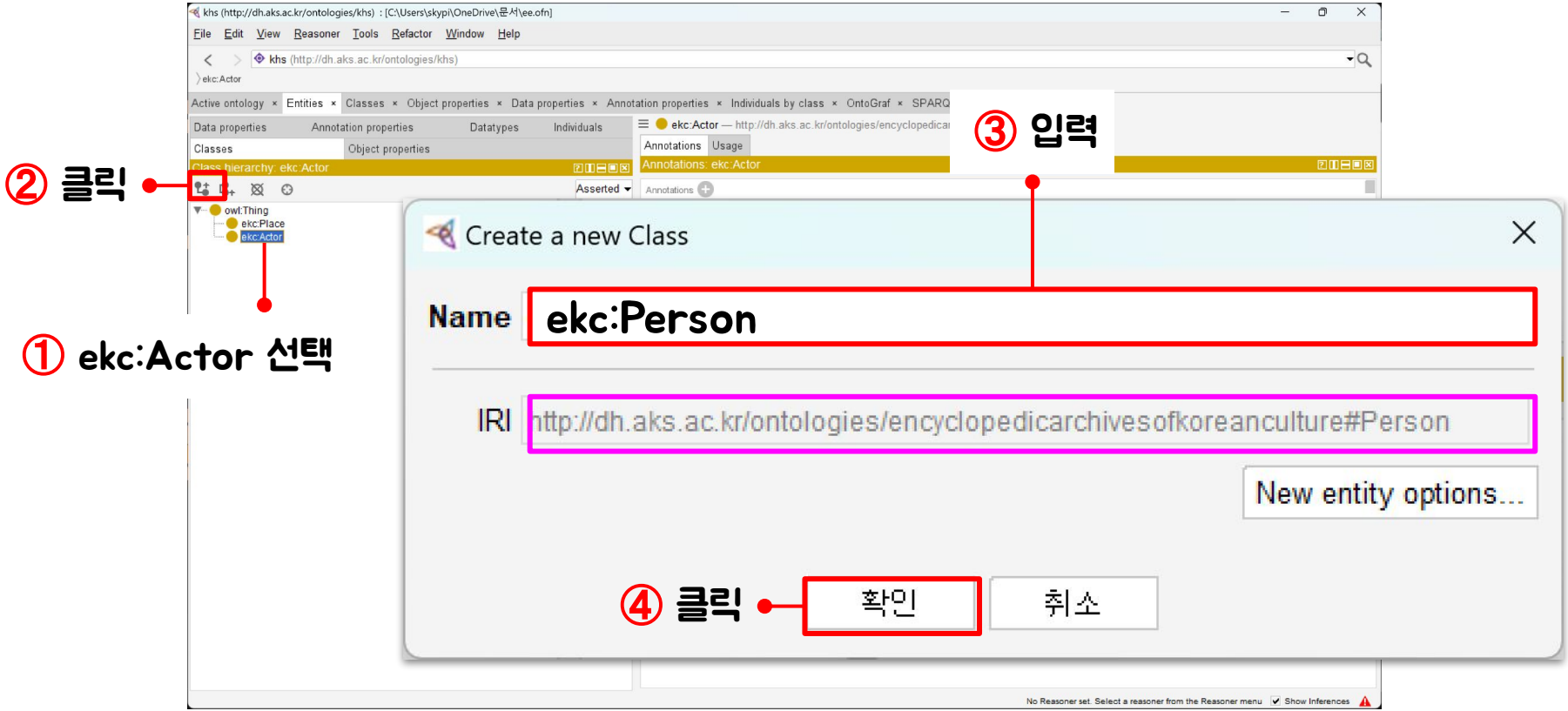
Entities : Sub Class 추가



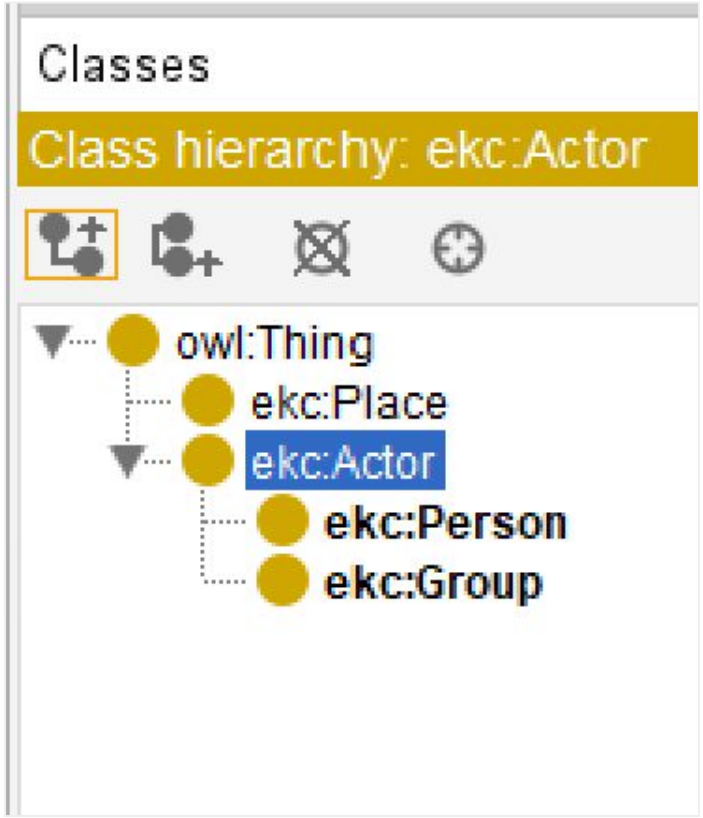
Entities : Sub Class 추가



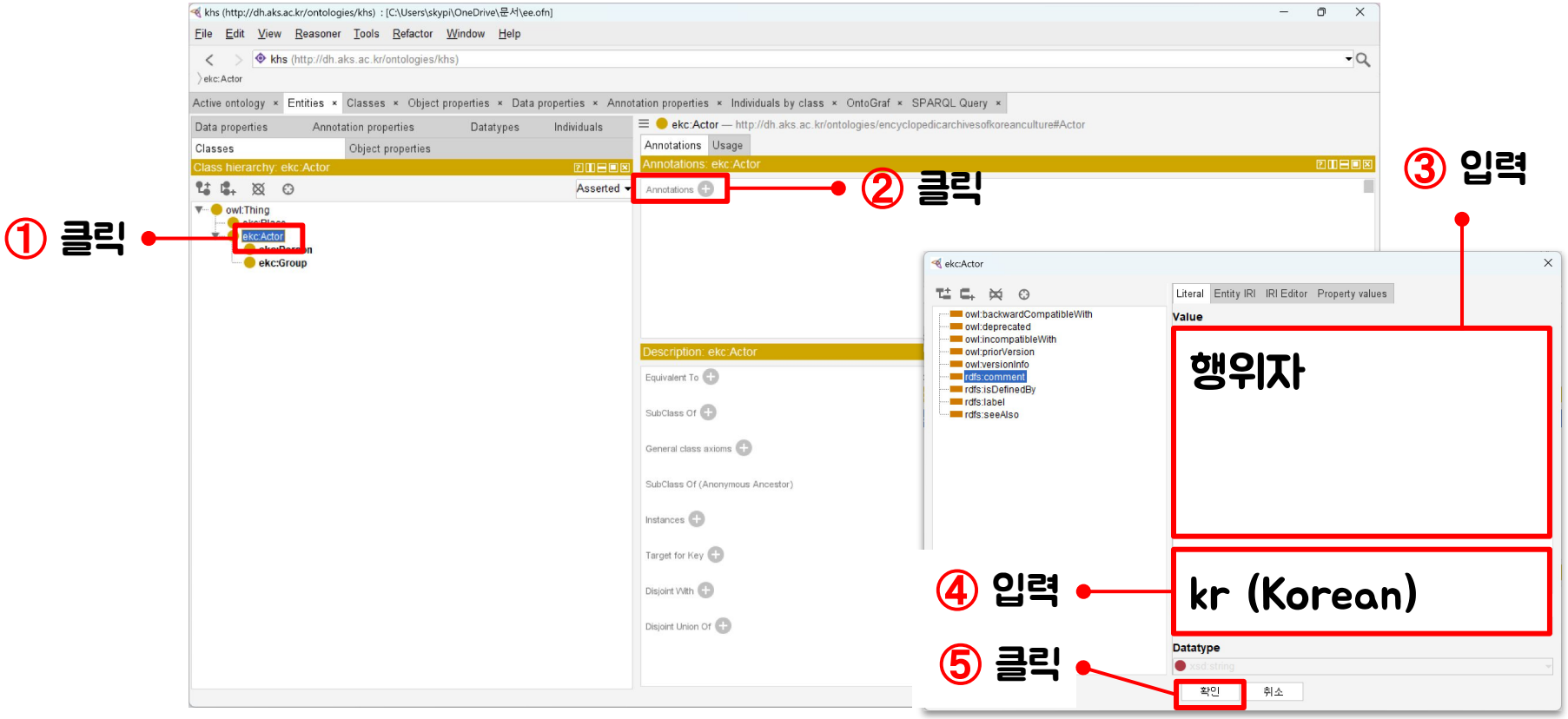
Entities : Sub Class 추가



Entities : Sub Class 추가

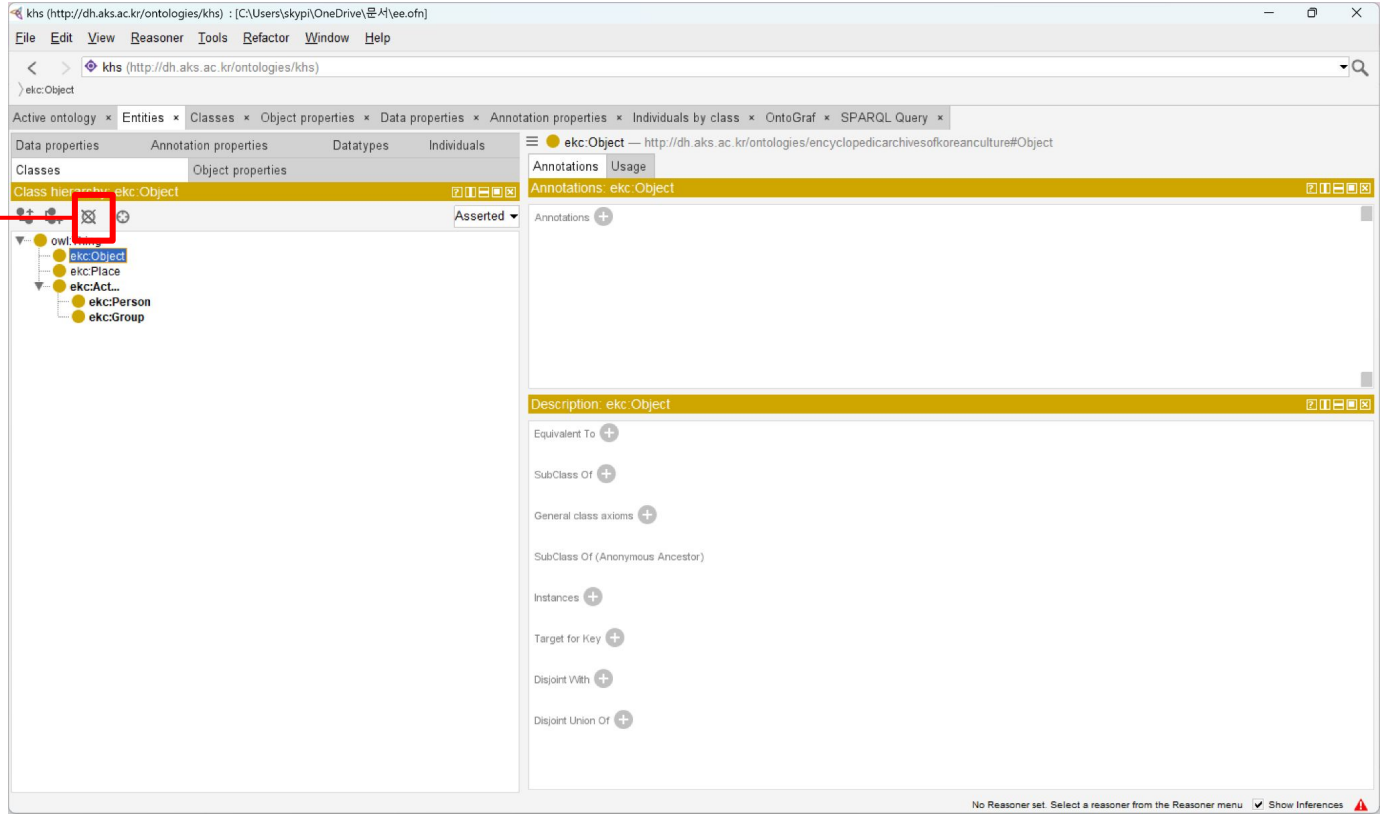


Entities : Class Annotation 입력

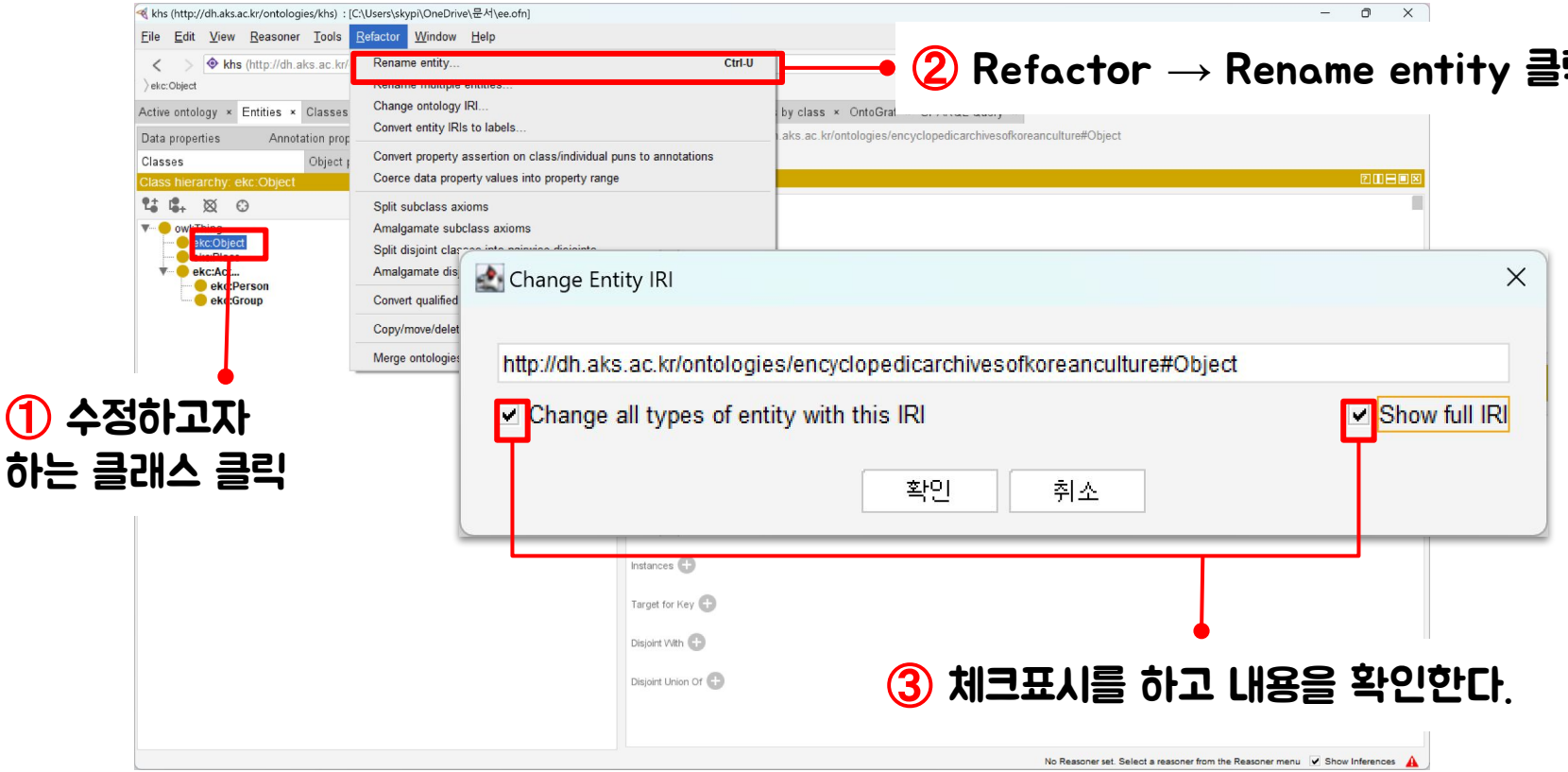


※ Delete (삭제)

클릭


khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypi\OneDrive\문서\ee.ofn]
File Edit View Reasoner Tools Refactor Window Help
khs (http://dh.aks.ac.kr/ontologies/khs)
ekc:Object
Active ontology × Entities × Classes × Object properties × Data properties × Annotation properties × Individuals by class × OntoGraf × SPARQL Query ×
Data properties Annotation properties Datatypes Individuals
Classes Object properties
Class hierarchy: ekc:Object
Asserted
owl:Thing
ekc:Object
ekc:Place
ekc:Act...
ekc:Person
ekc:Group
ekc:Object — http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Object
Annotations Usage
Annotations: ekc:Object
Annotations
Description: ekc:Object
Equivalent To
SubClass Of
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of
No Reasoner set. Select a reasoner from the Reasoner menu
Show Inferences

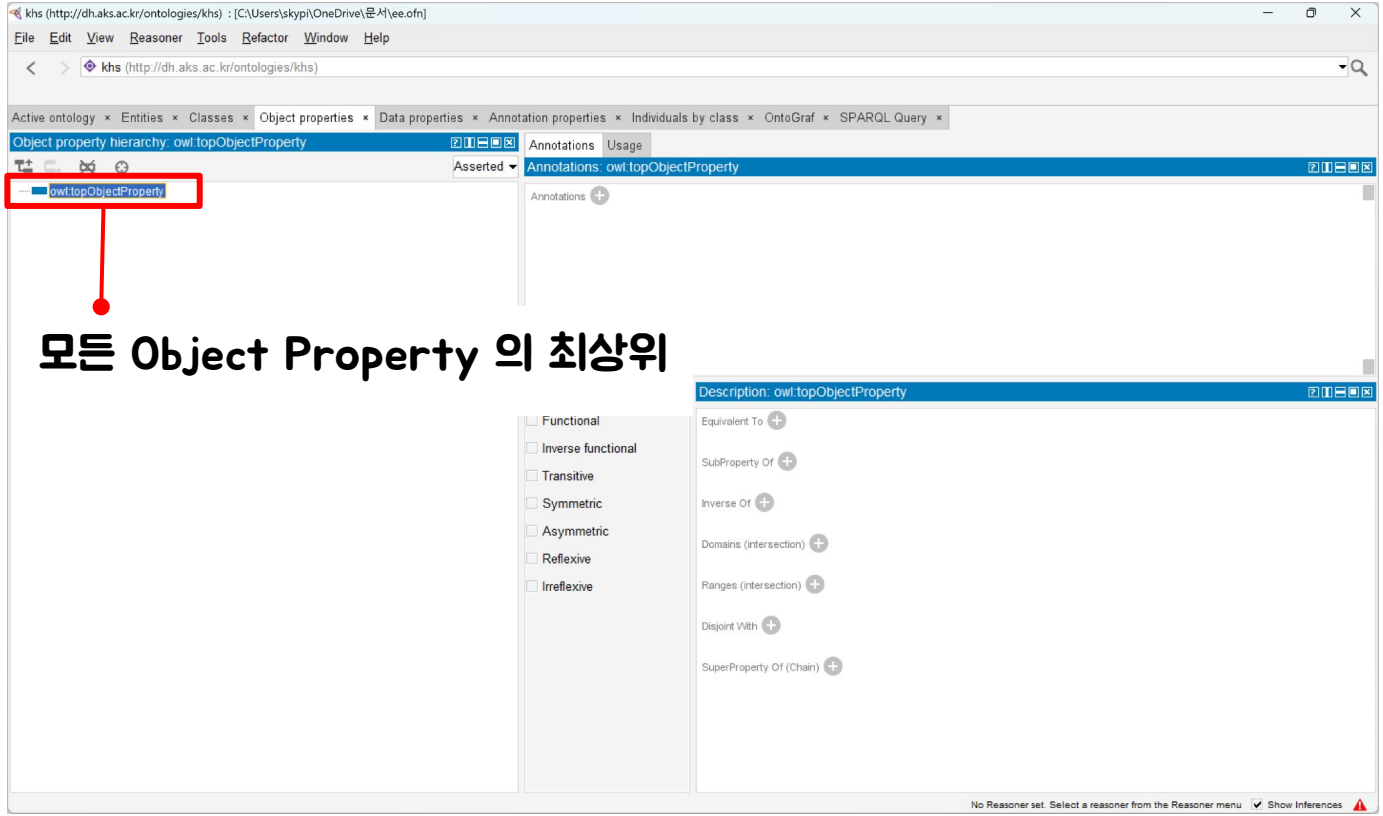
※ Rename entity (수정)



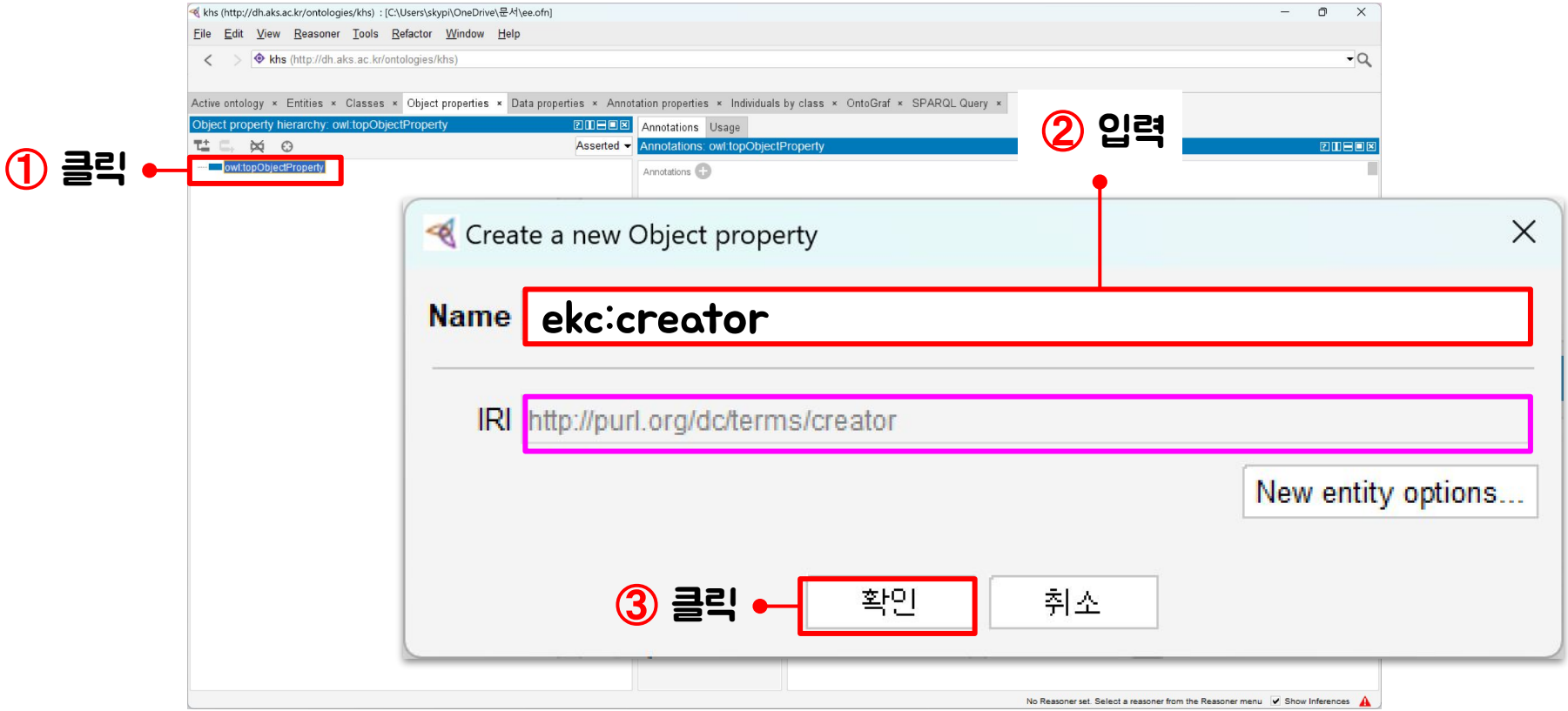
5

프로테제 실습 - Object properties

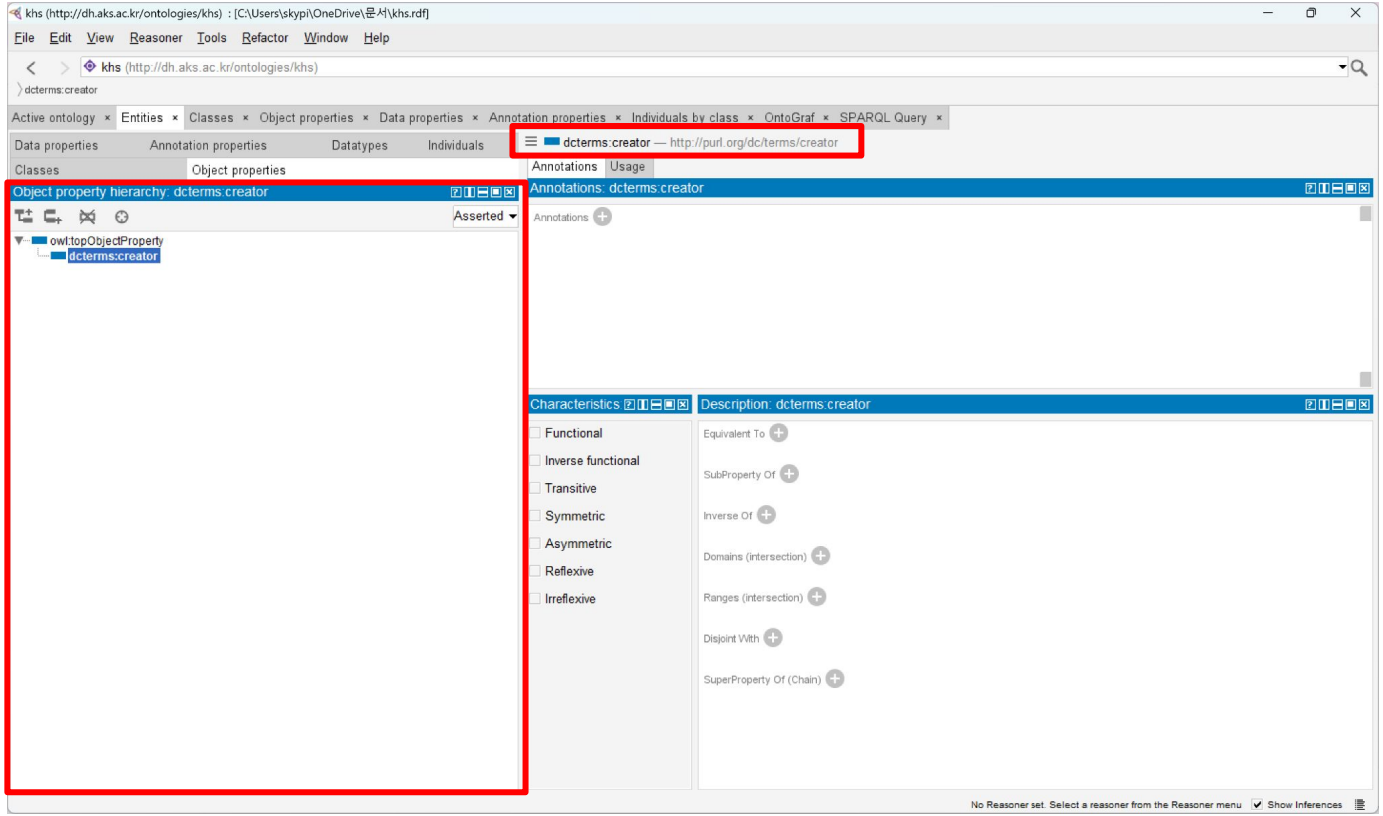
Object properties : Sub Property 추가



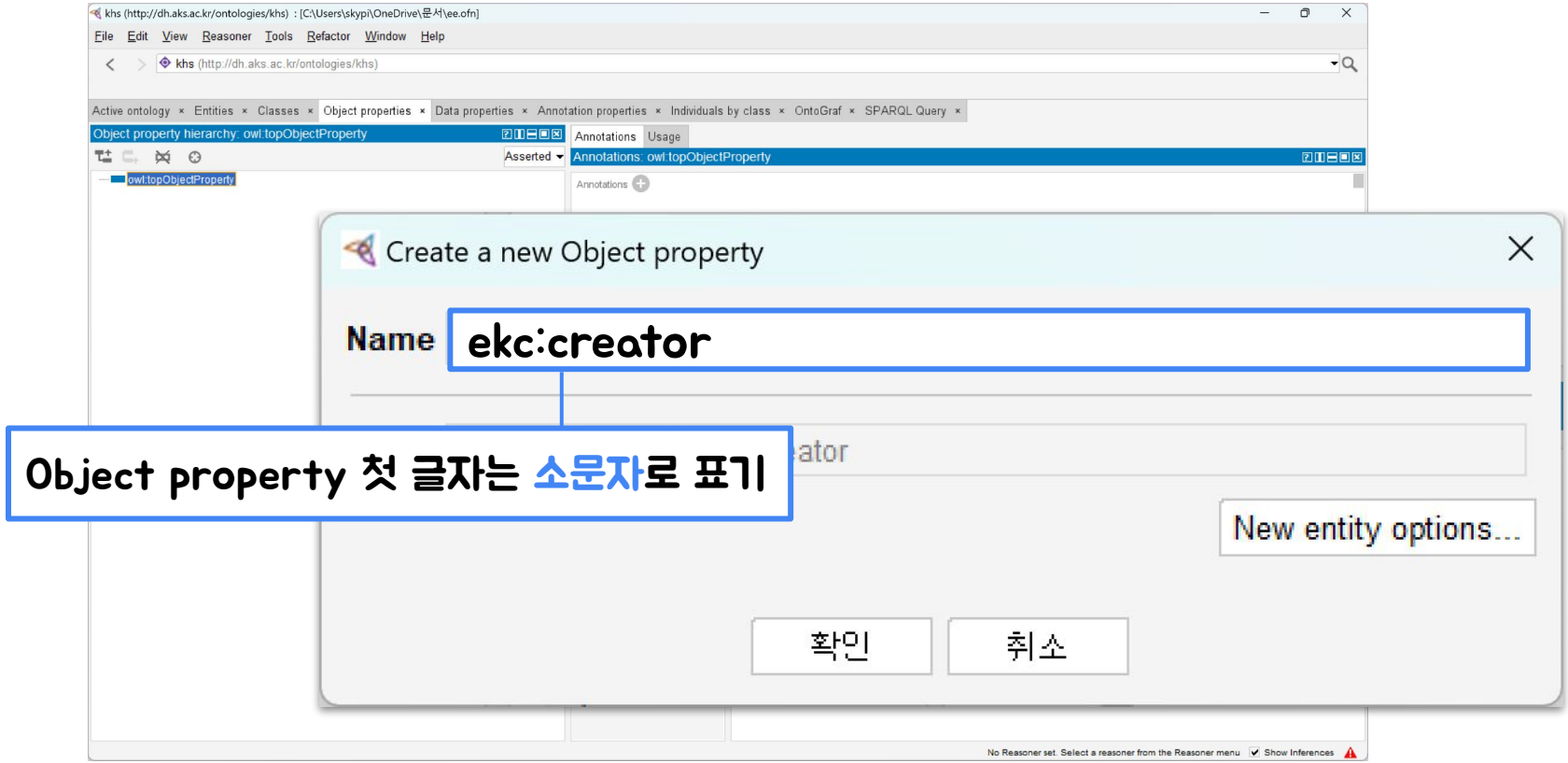
Object properties : Sub Property 추가



Object properties : Sub Property 추가

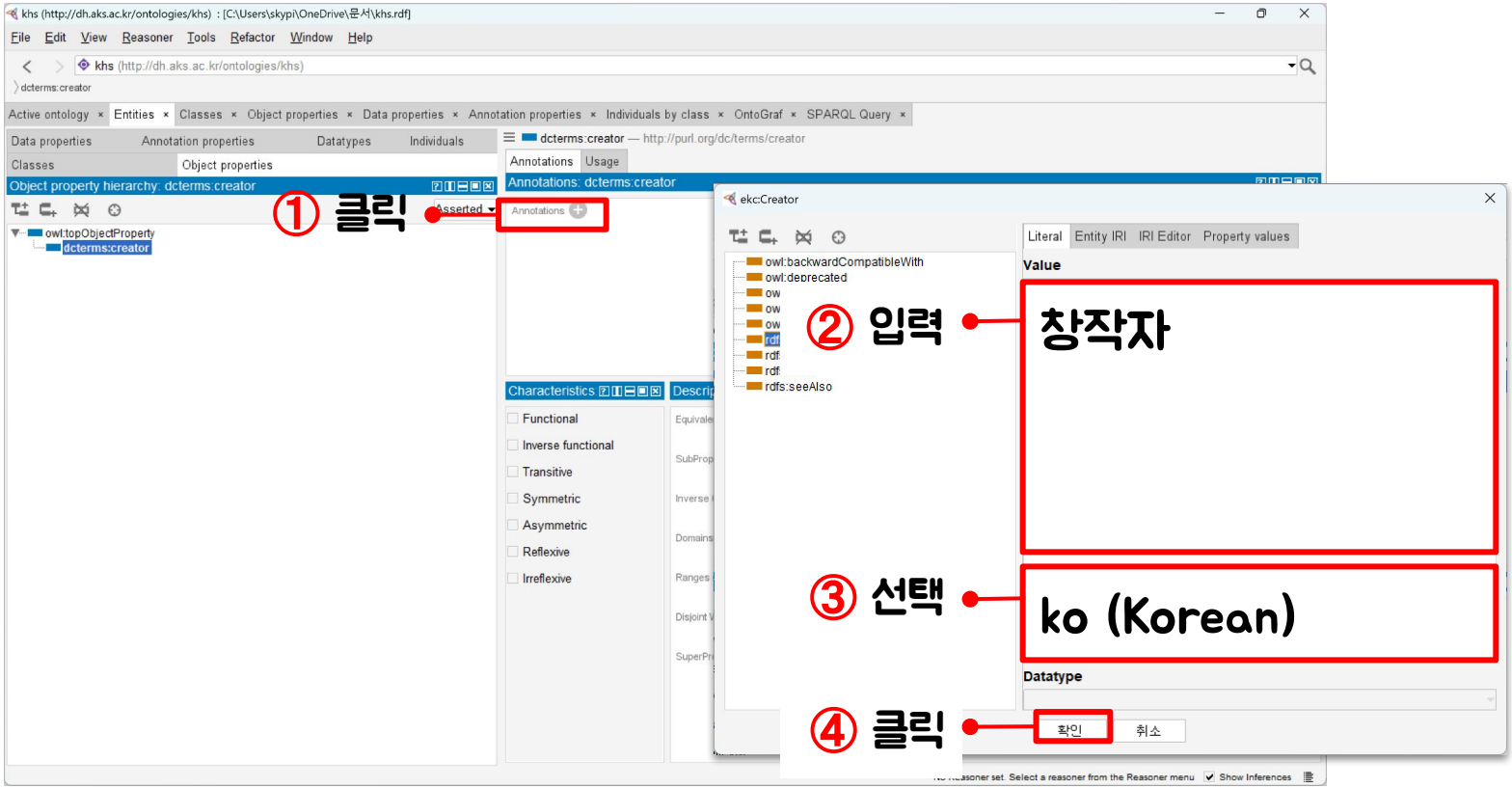


※ Object property 규칙

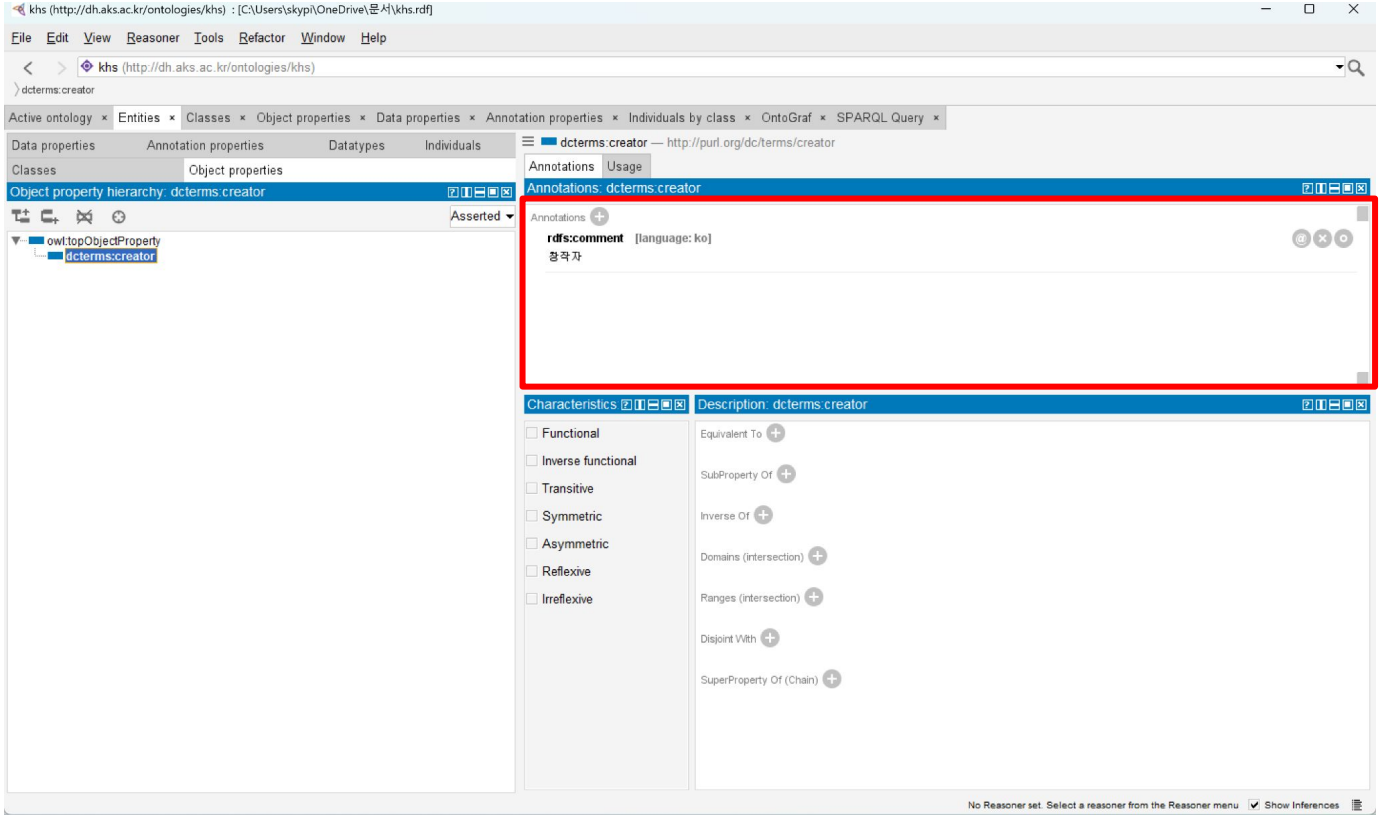


Object property 첫 글자는 소문자로 표기

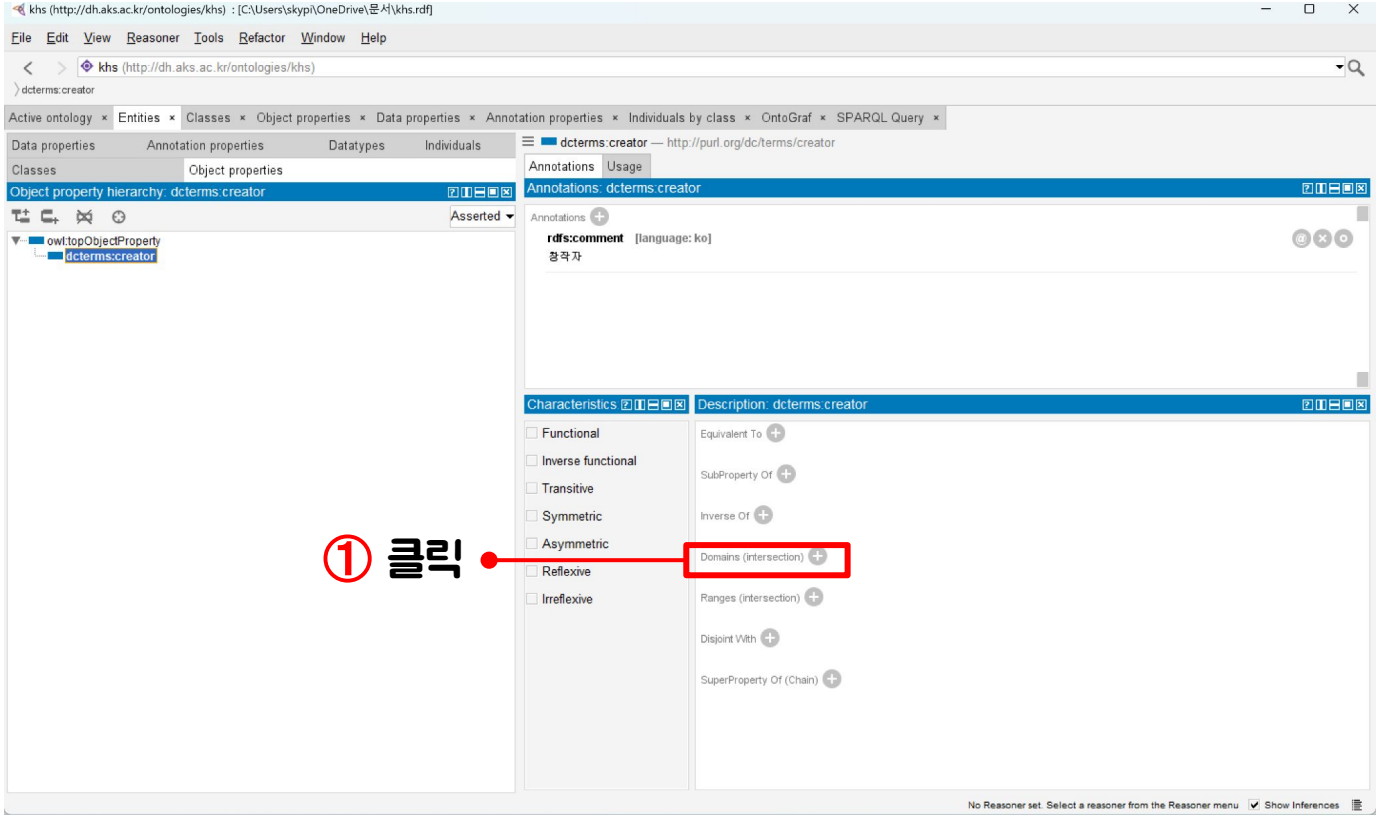
Object properties : Property Annotation 입력



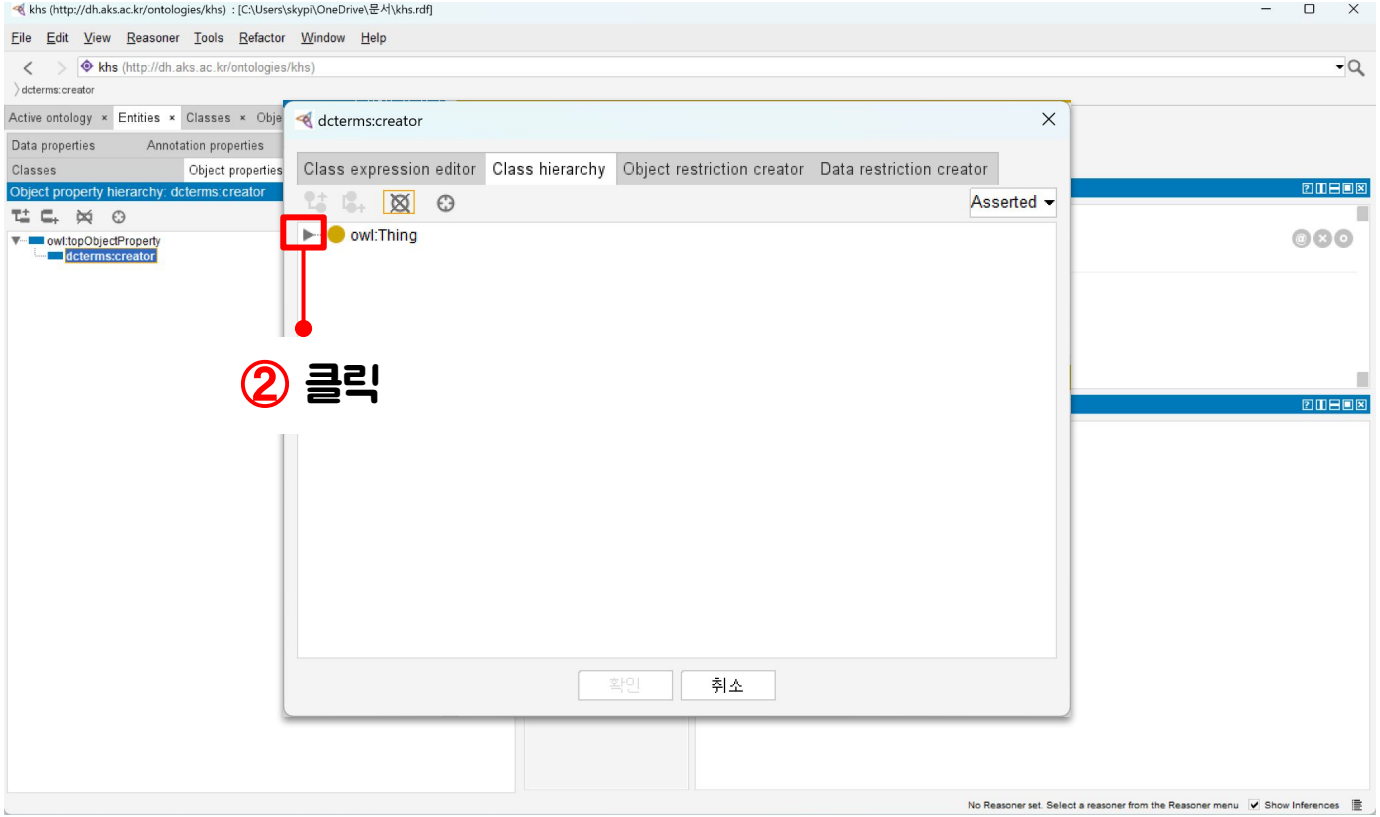
Object properties : Property Annotation 입력



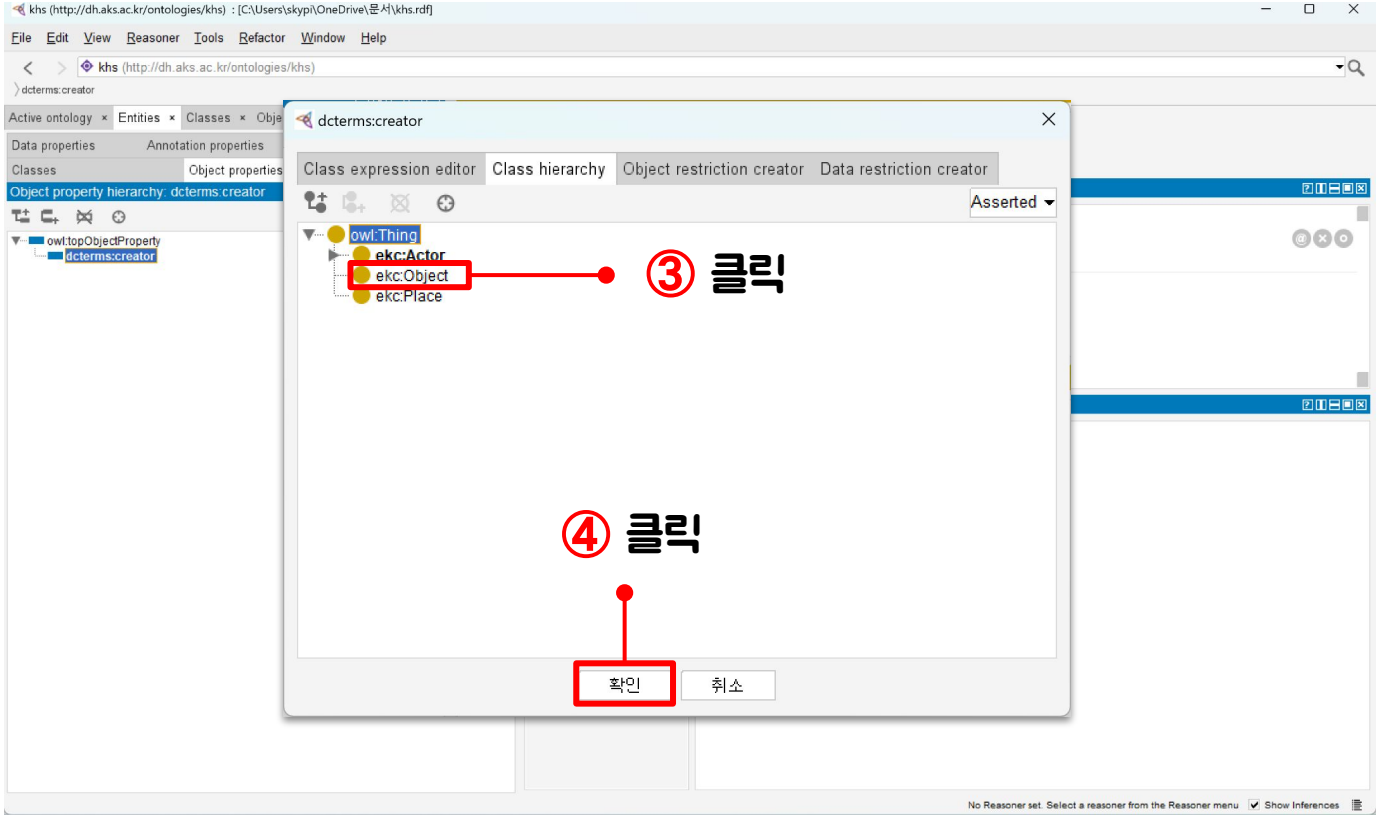
Object properties : Domain / Range 입력



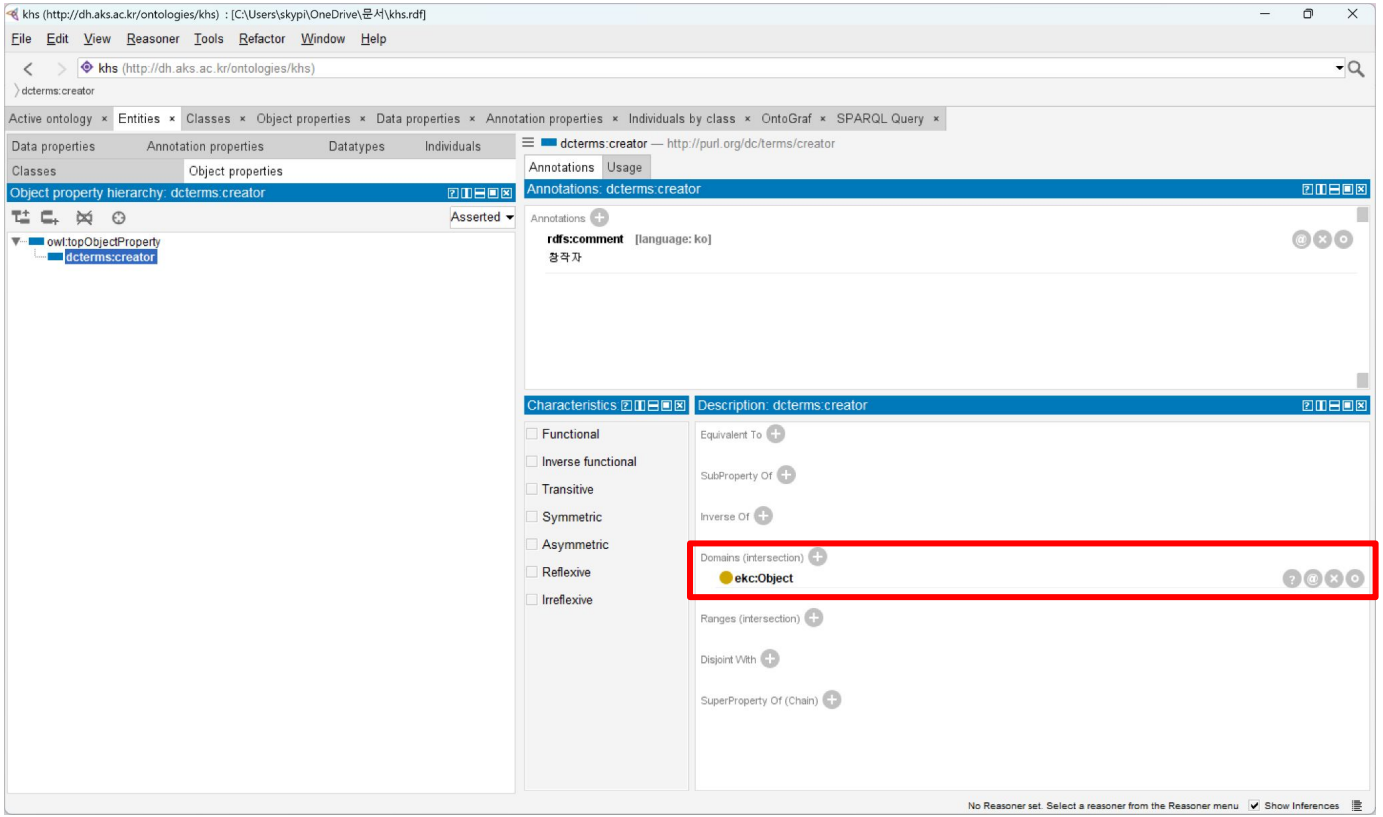
Object properties : Domain / Range 입력



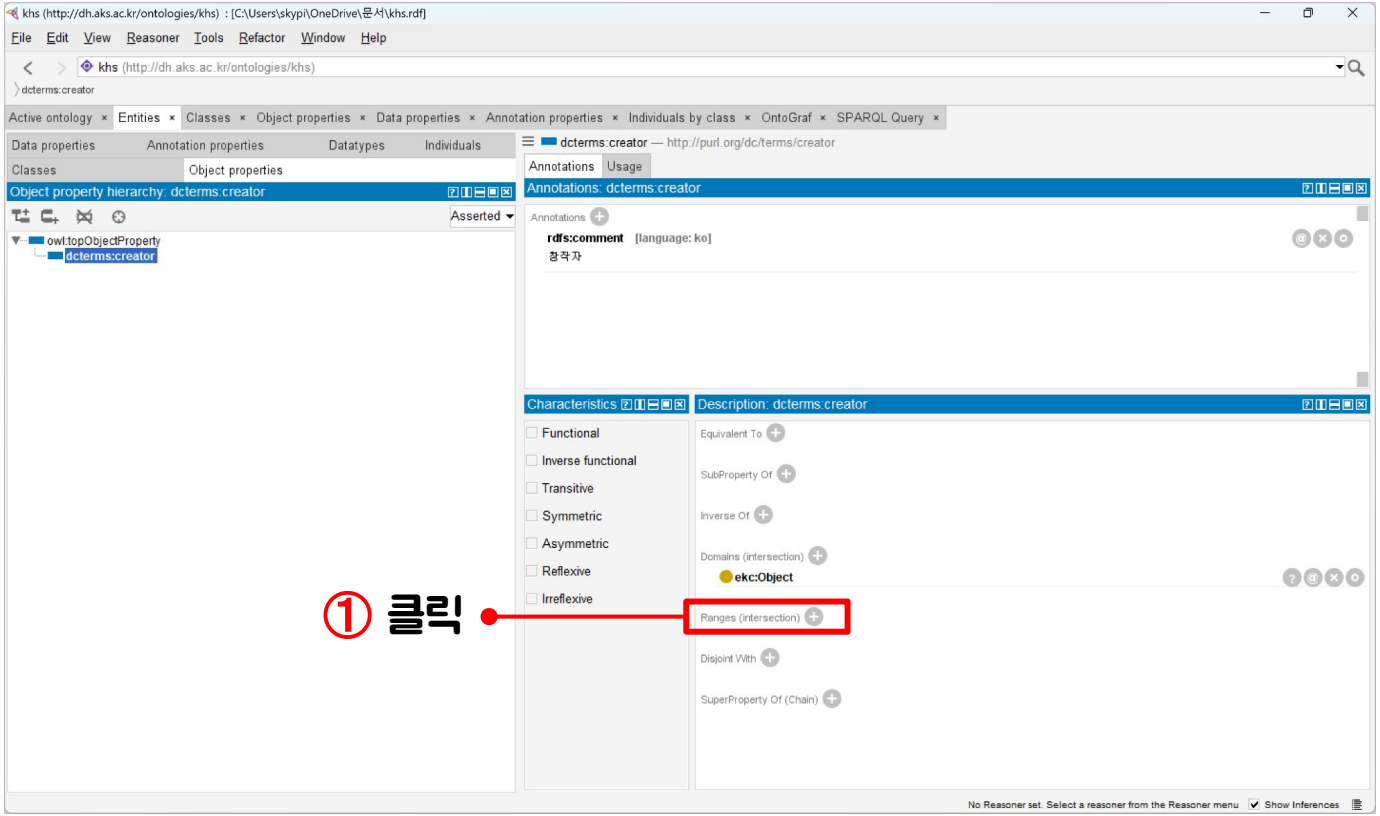
Object properties : Domain / Range 입력



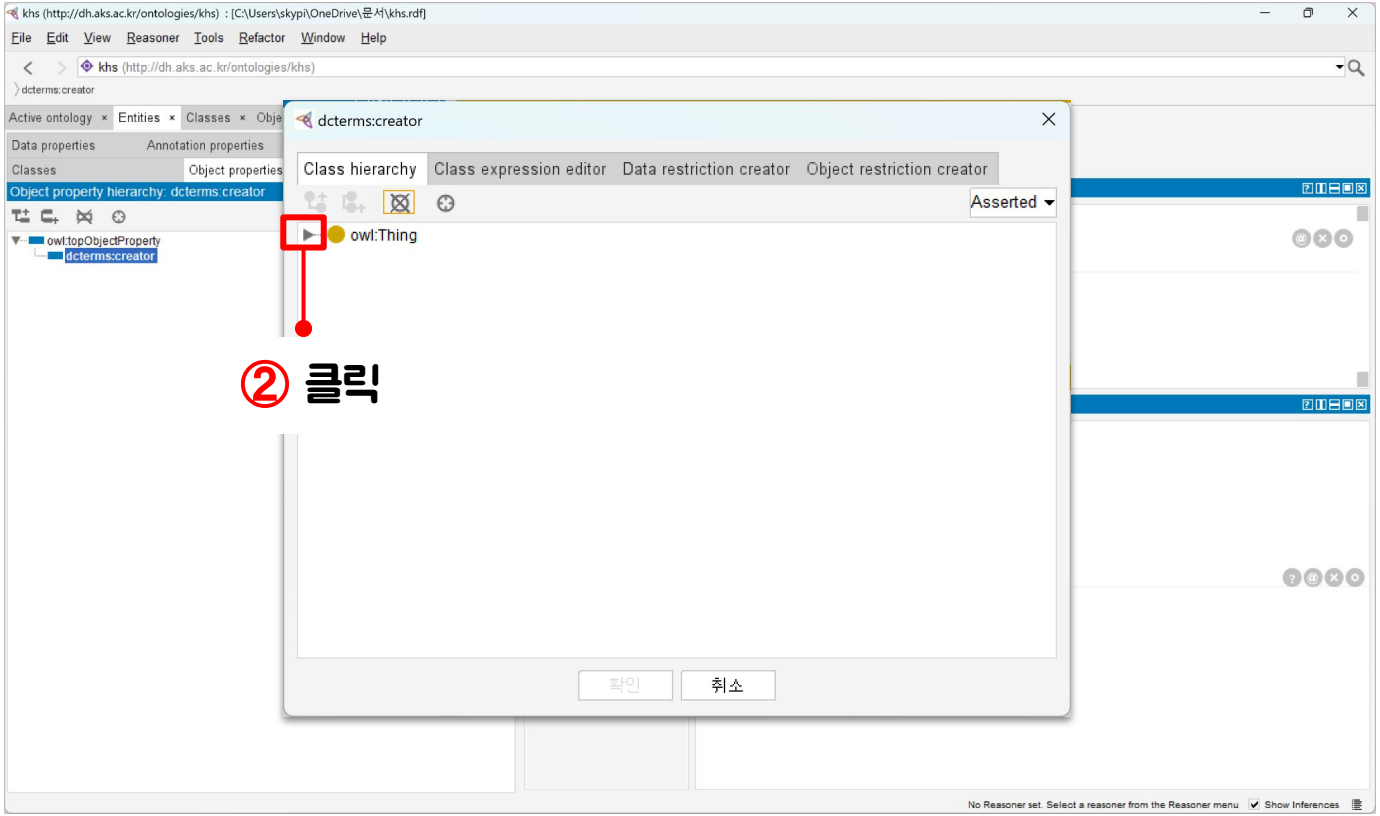
Object properties : Domain / Range 입력



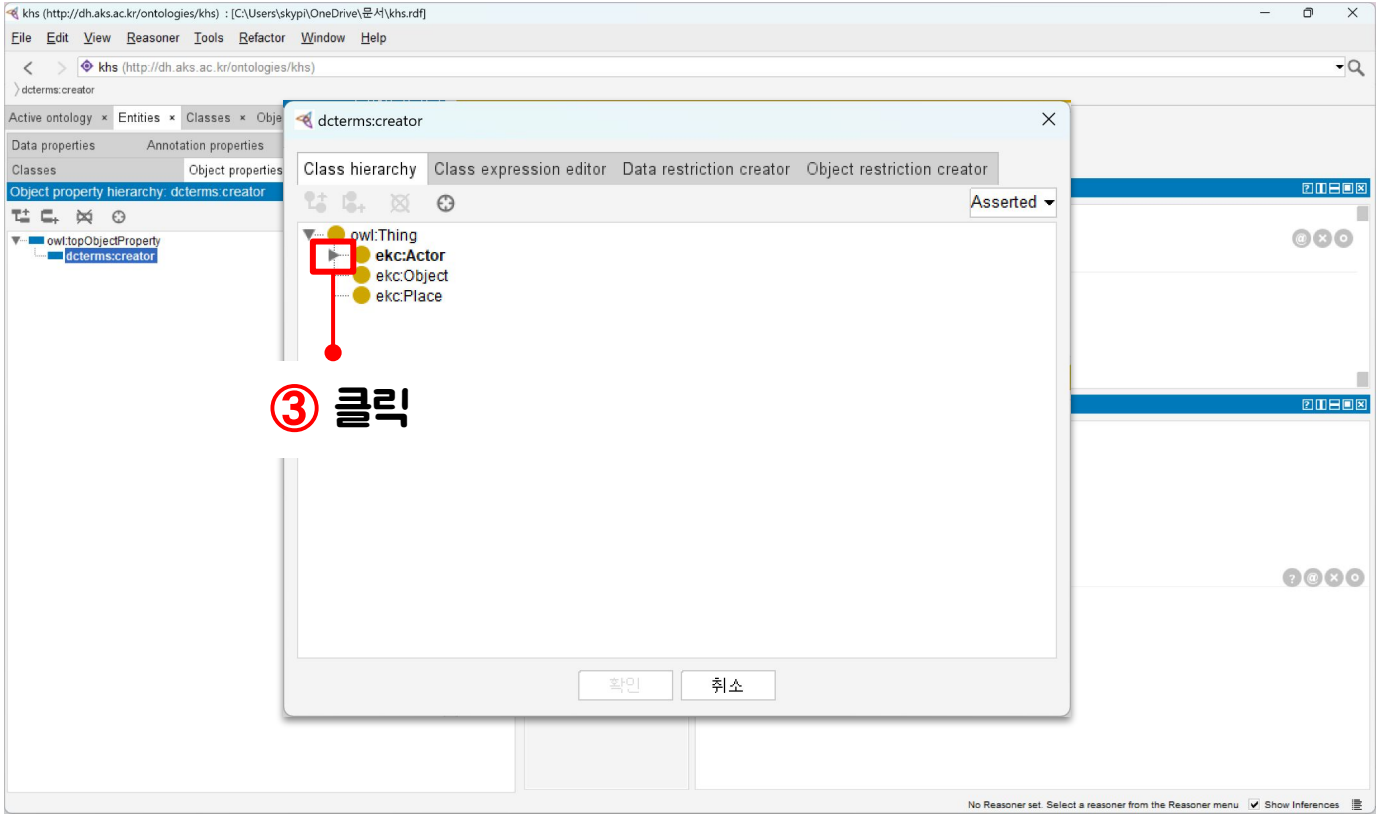
Object properties : Domain / Range 입력



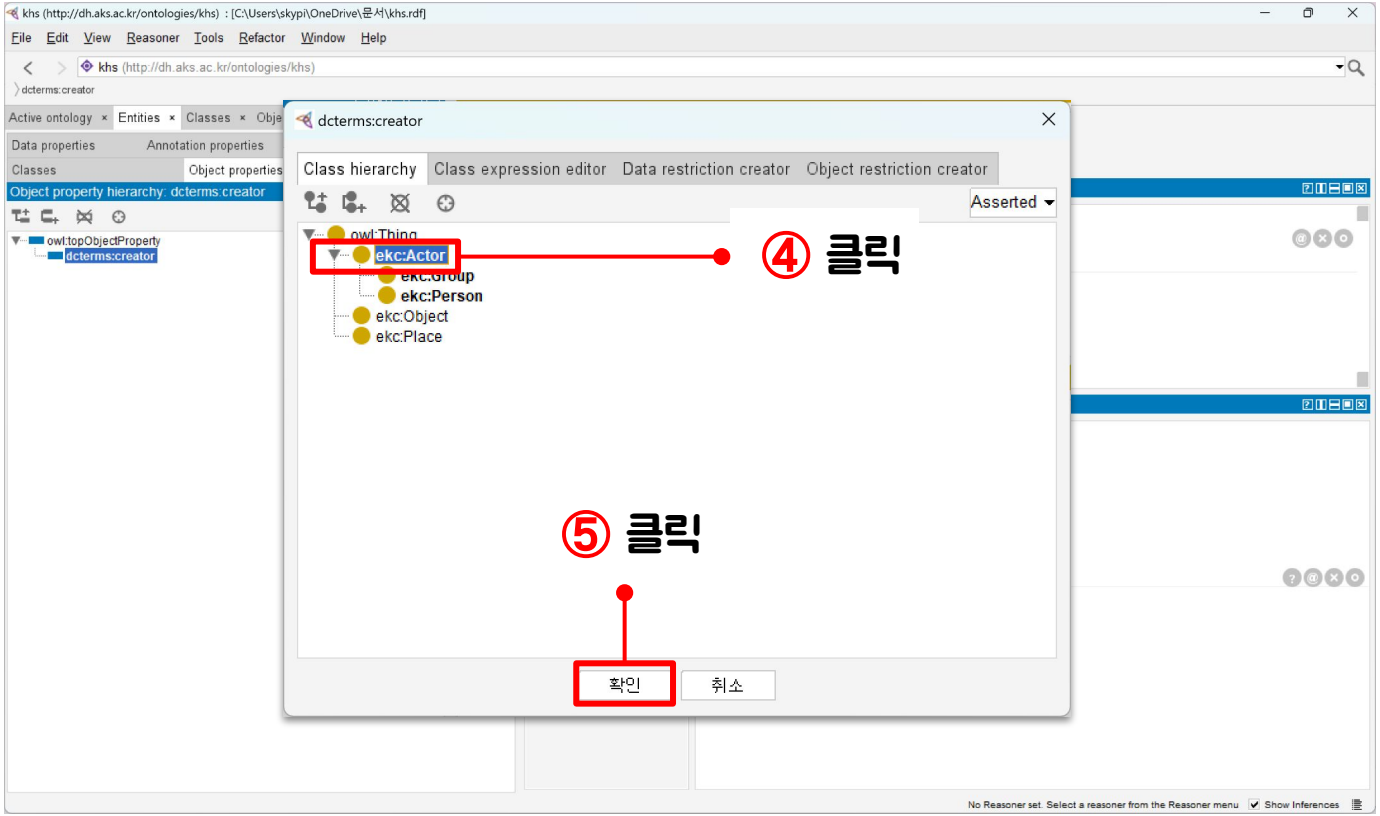
Object properties : Domain / Range 입력



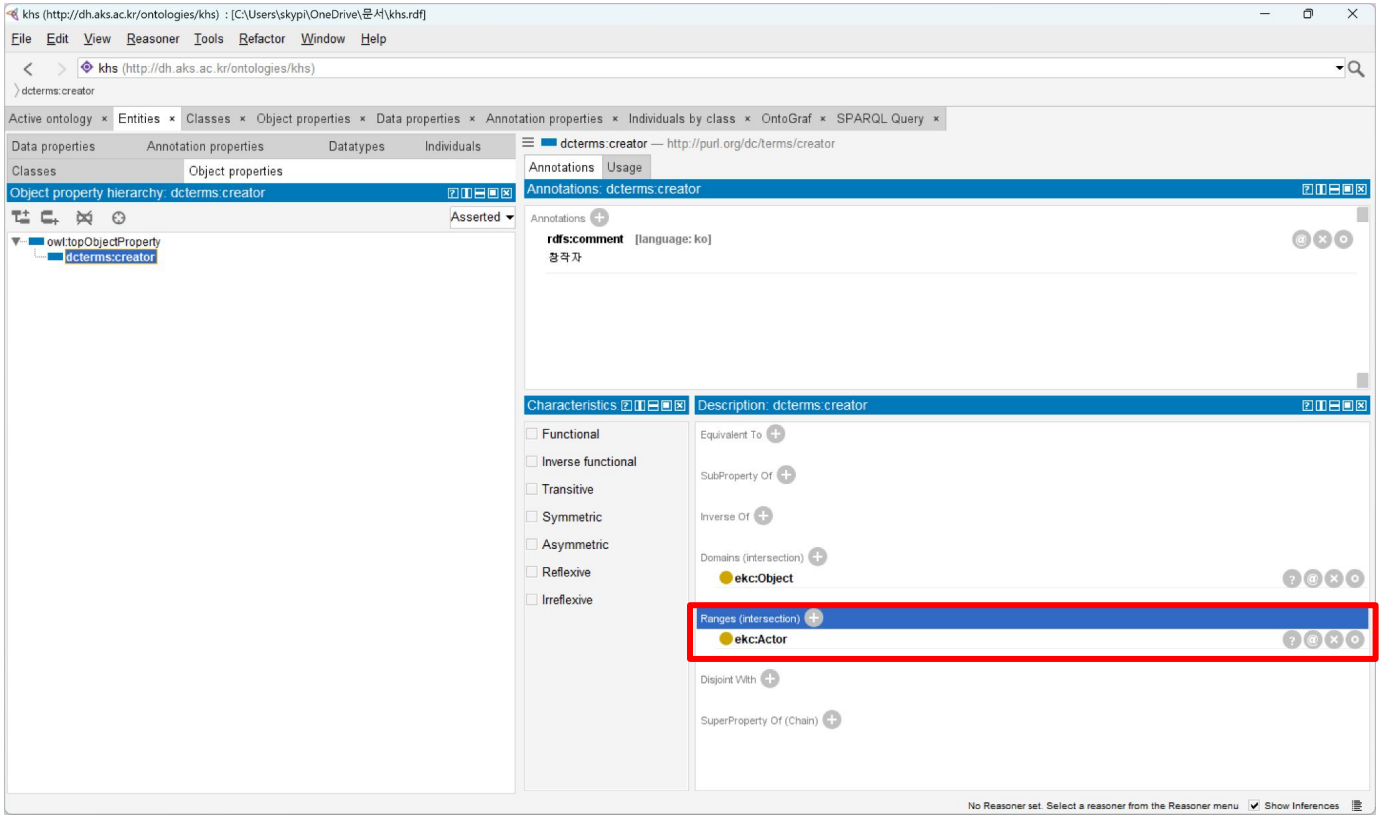
Object properties : Domain / Range 입력



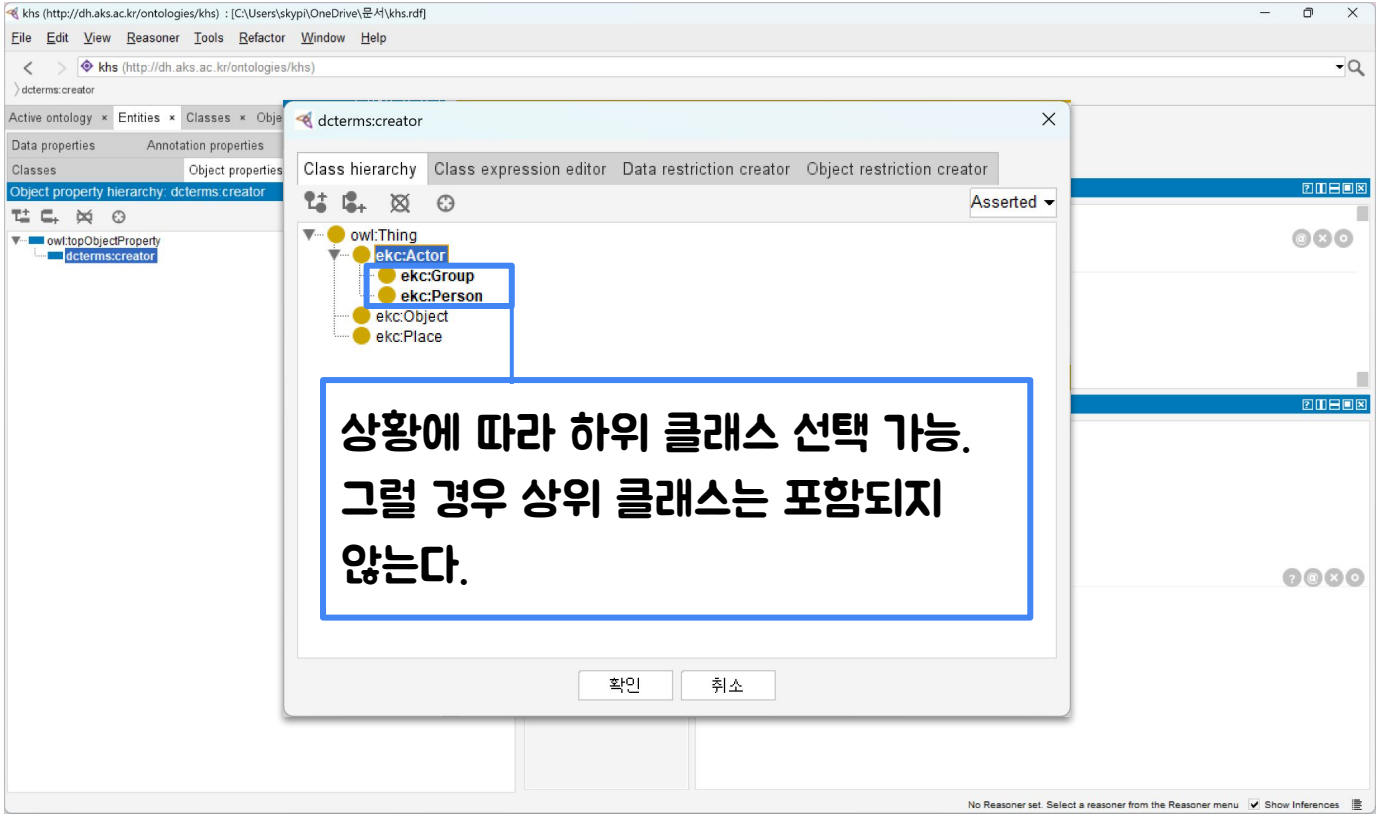
Object properties : Domain / Range 입력



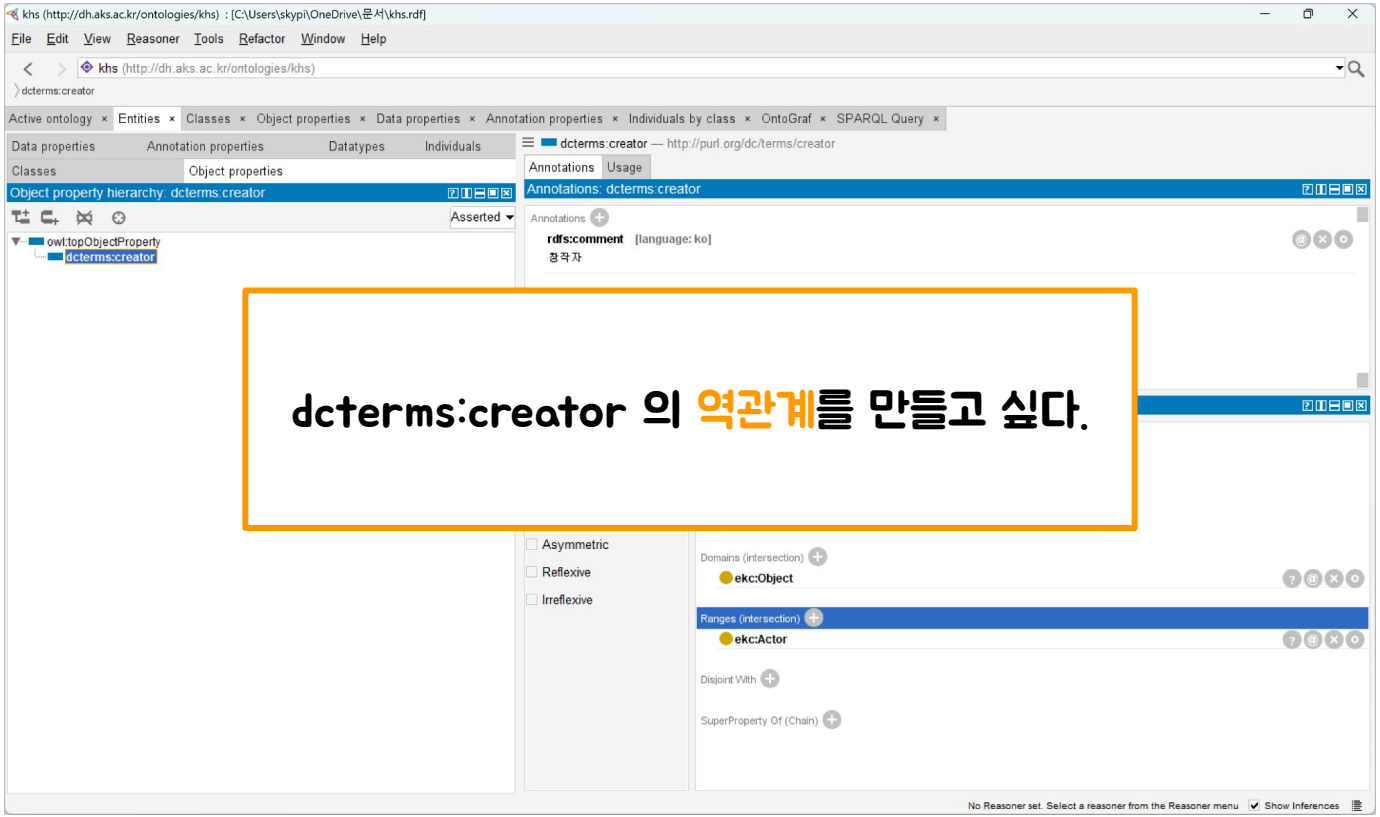
Object properties : Domain / Range 입력



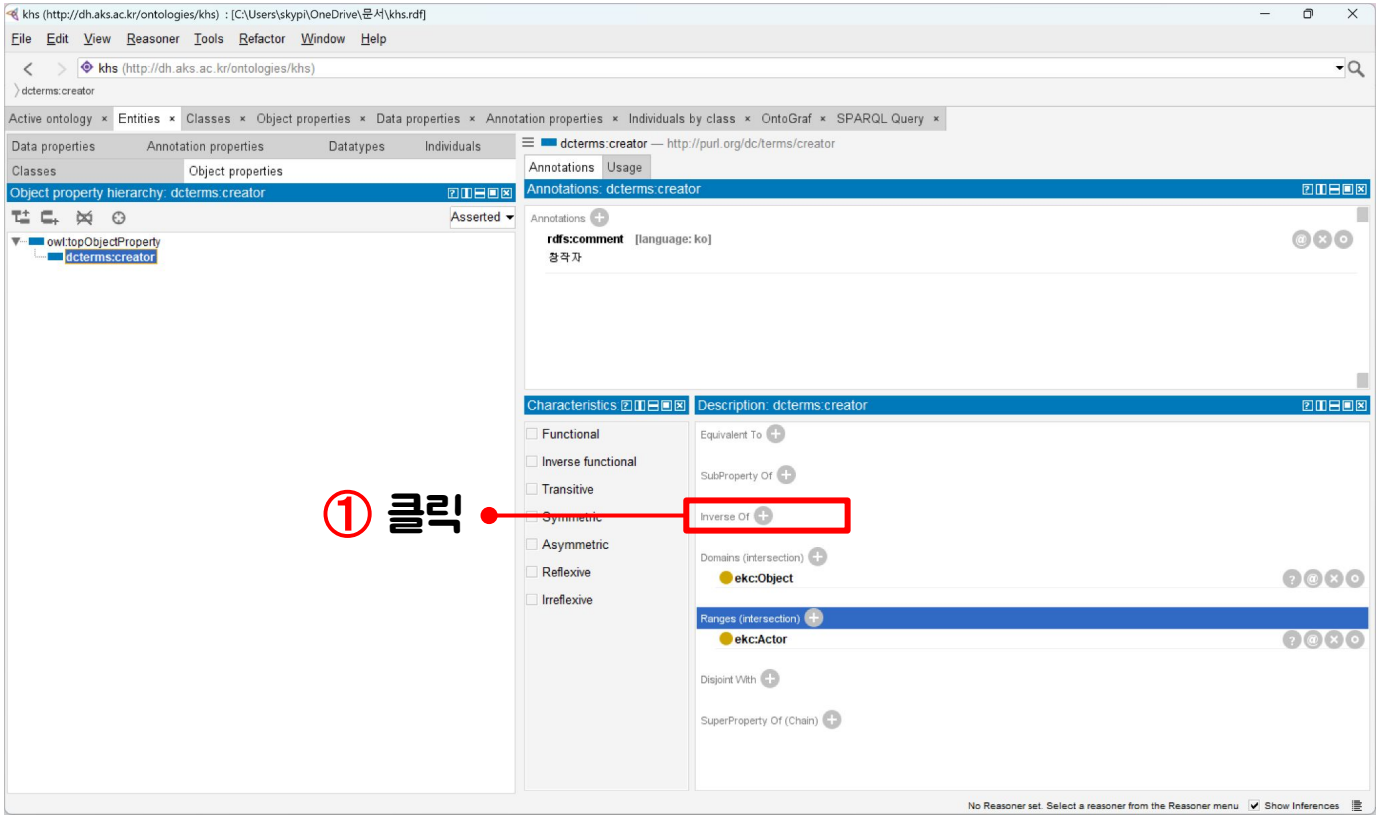
※ Domain / Range 선택 시 주의



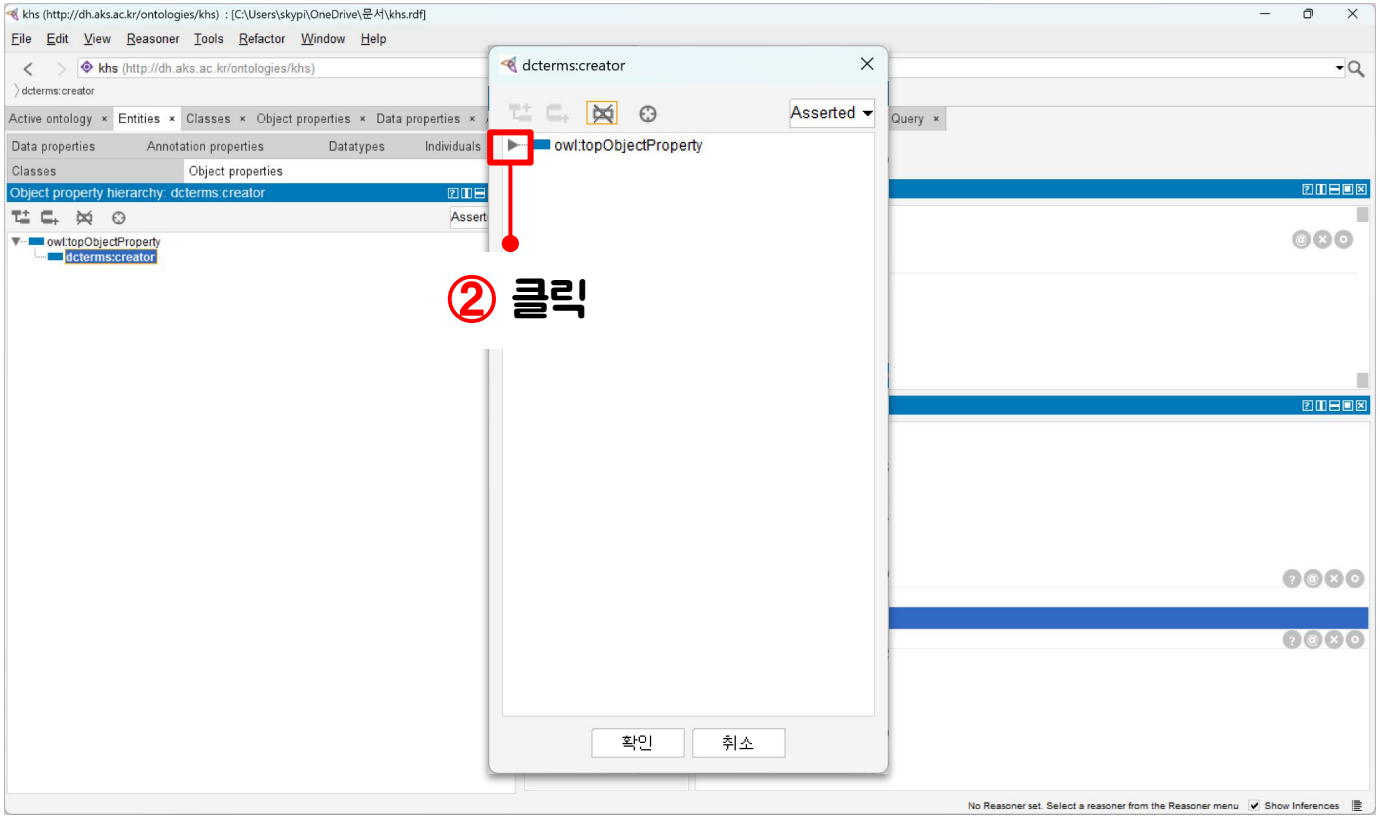
Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력



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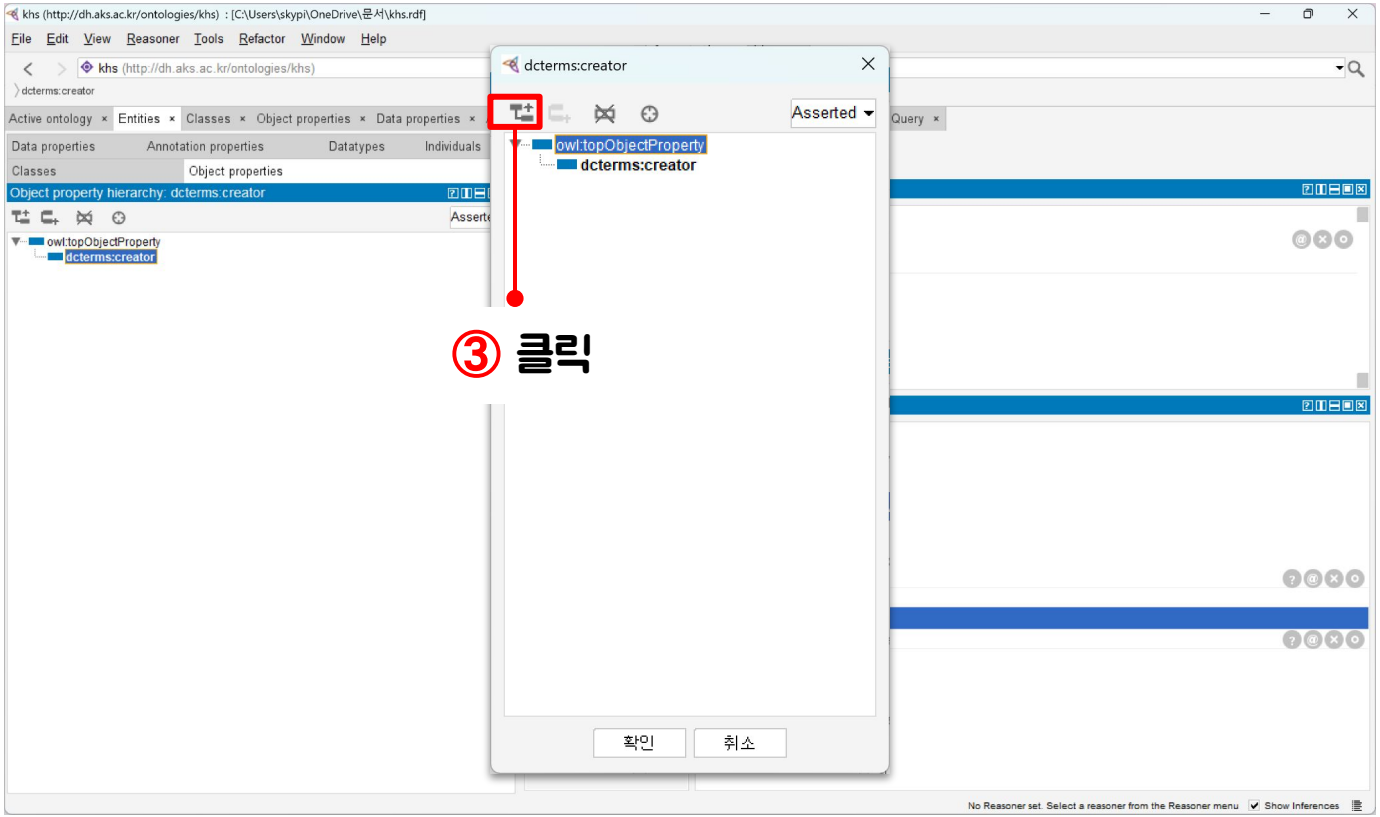

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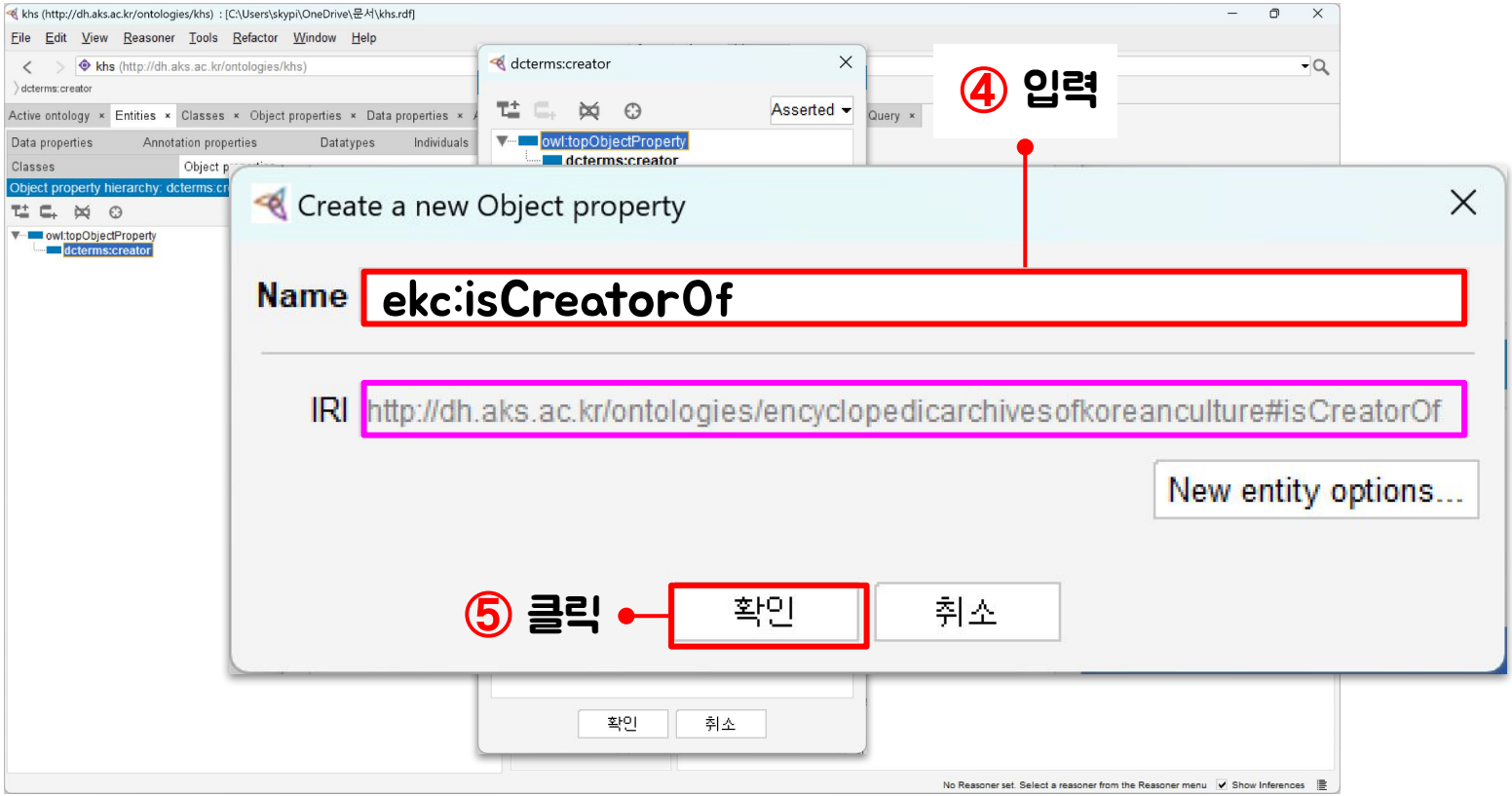
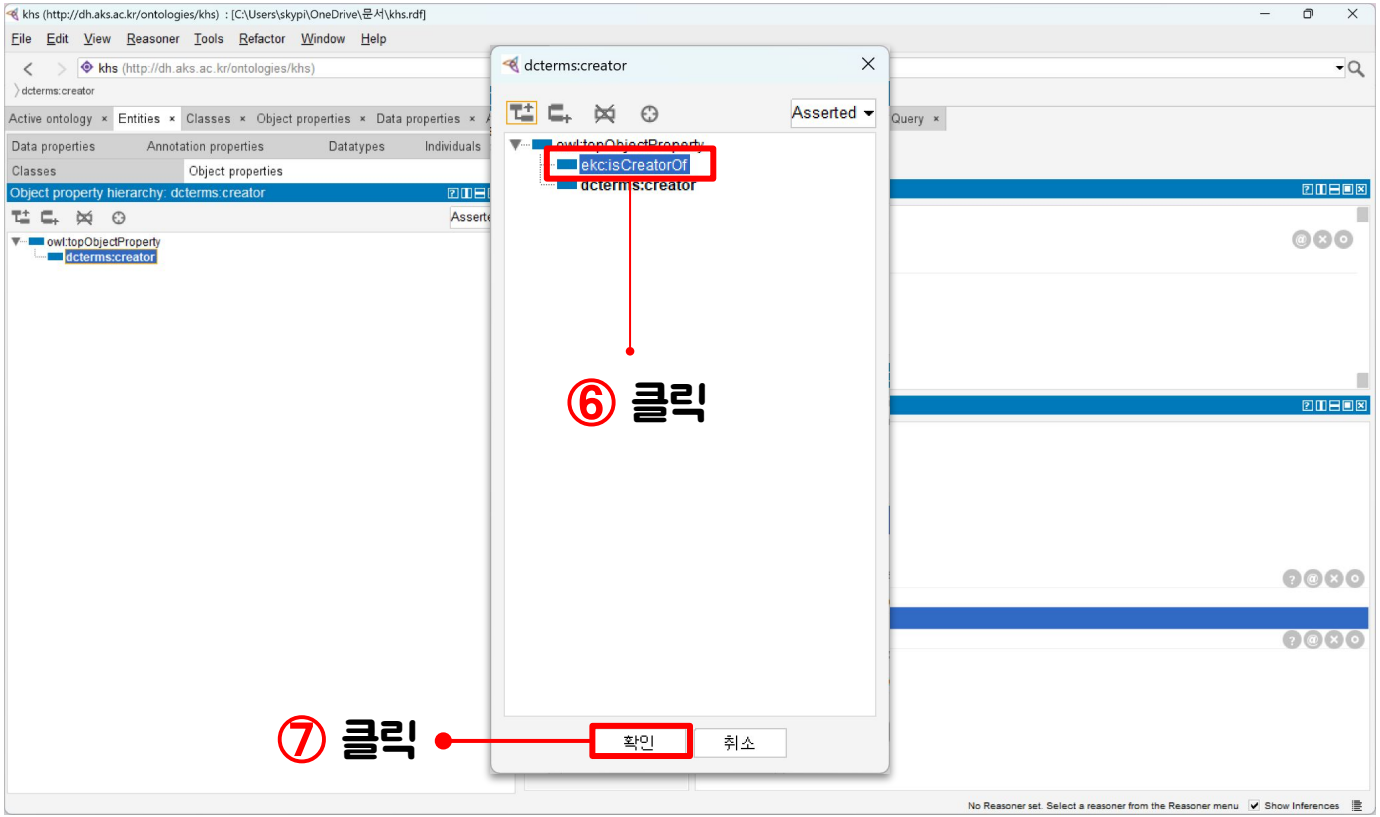
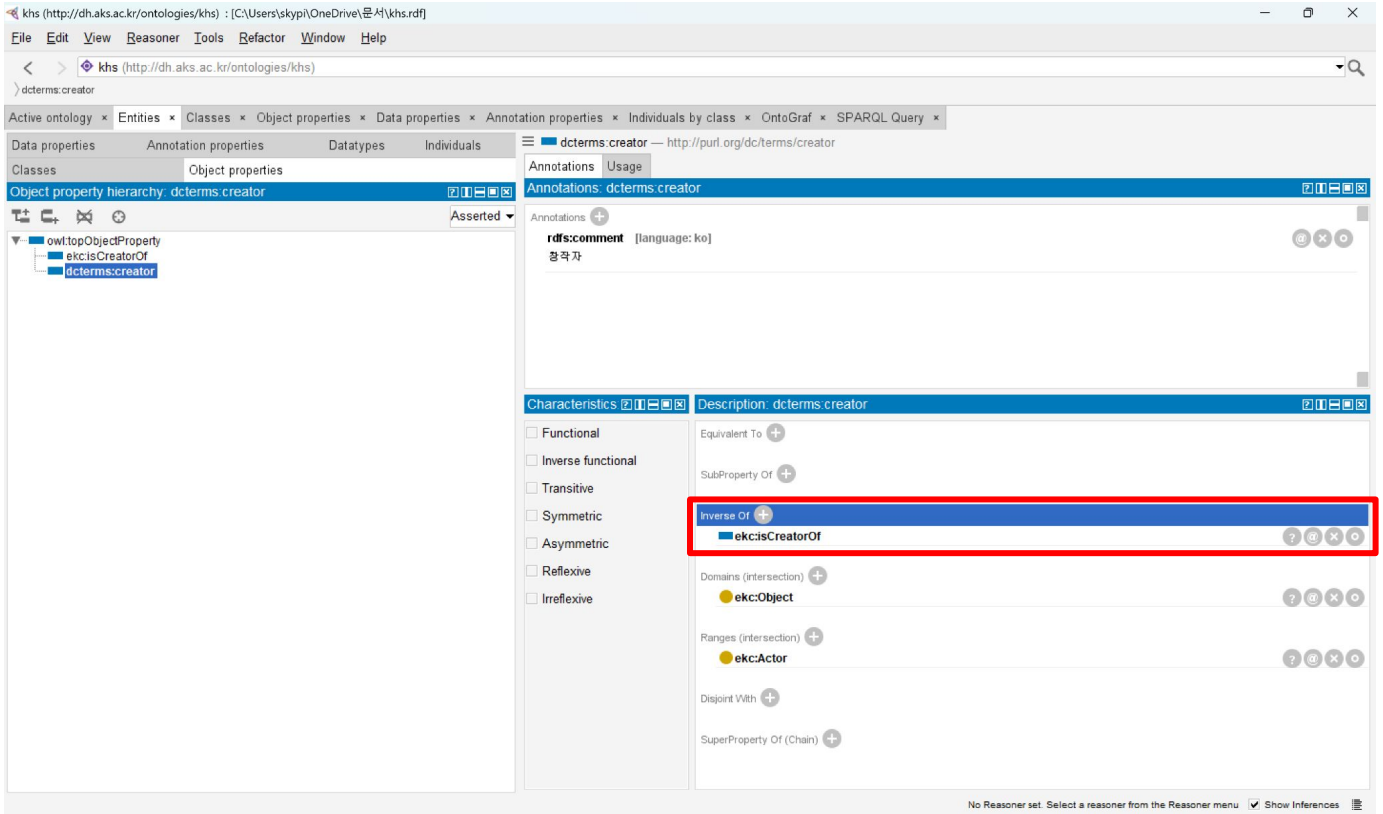


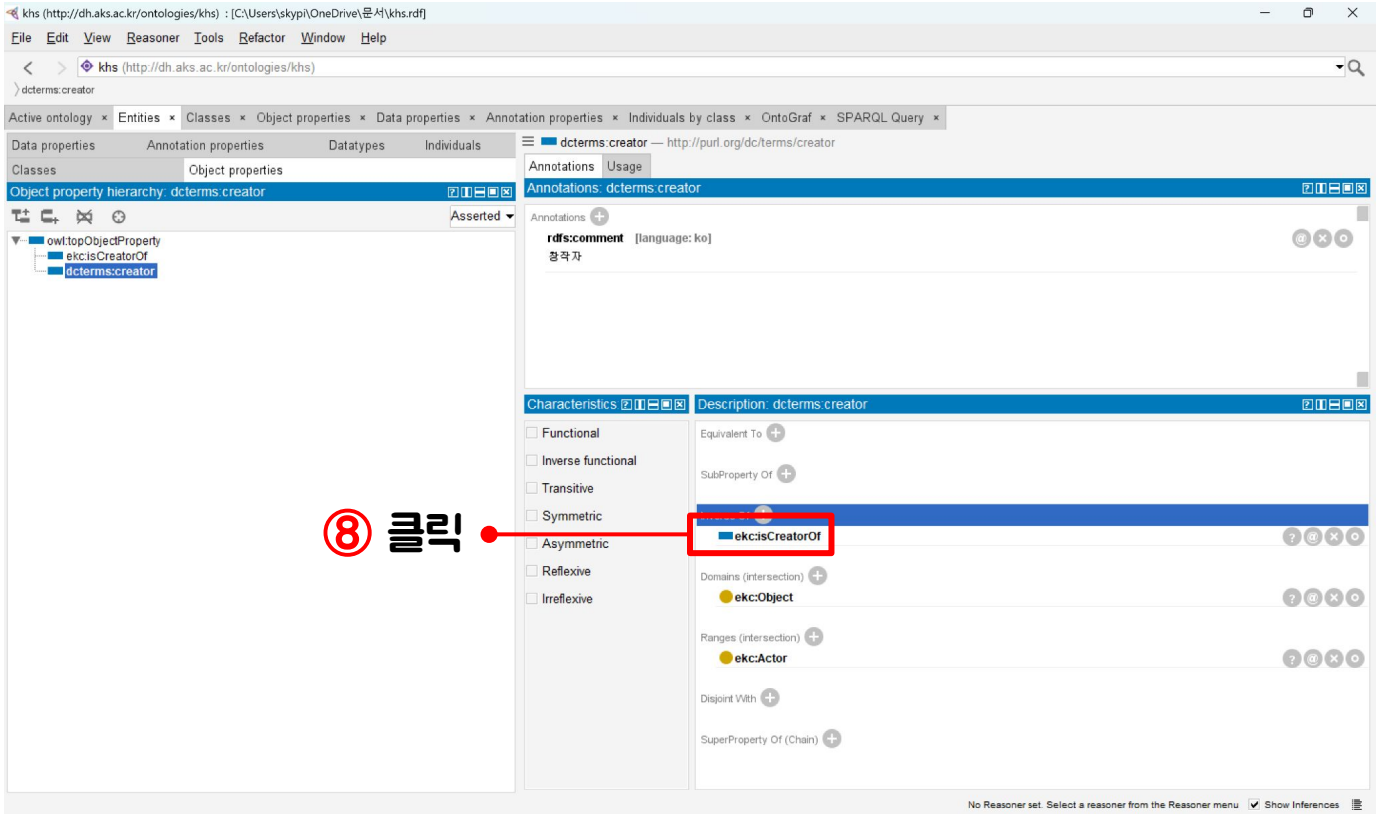
Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력



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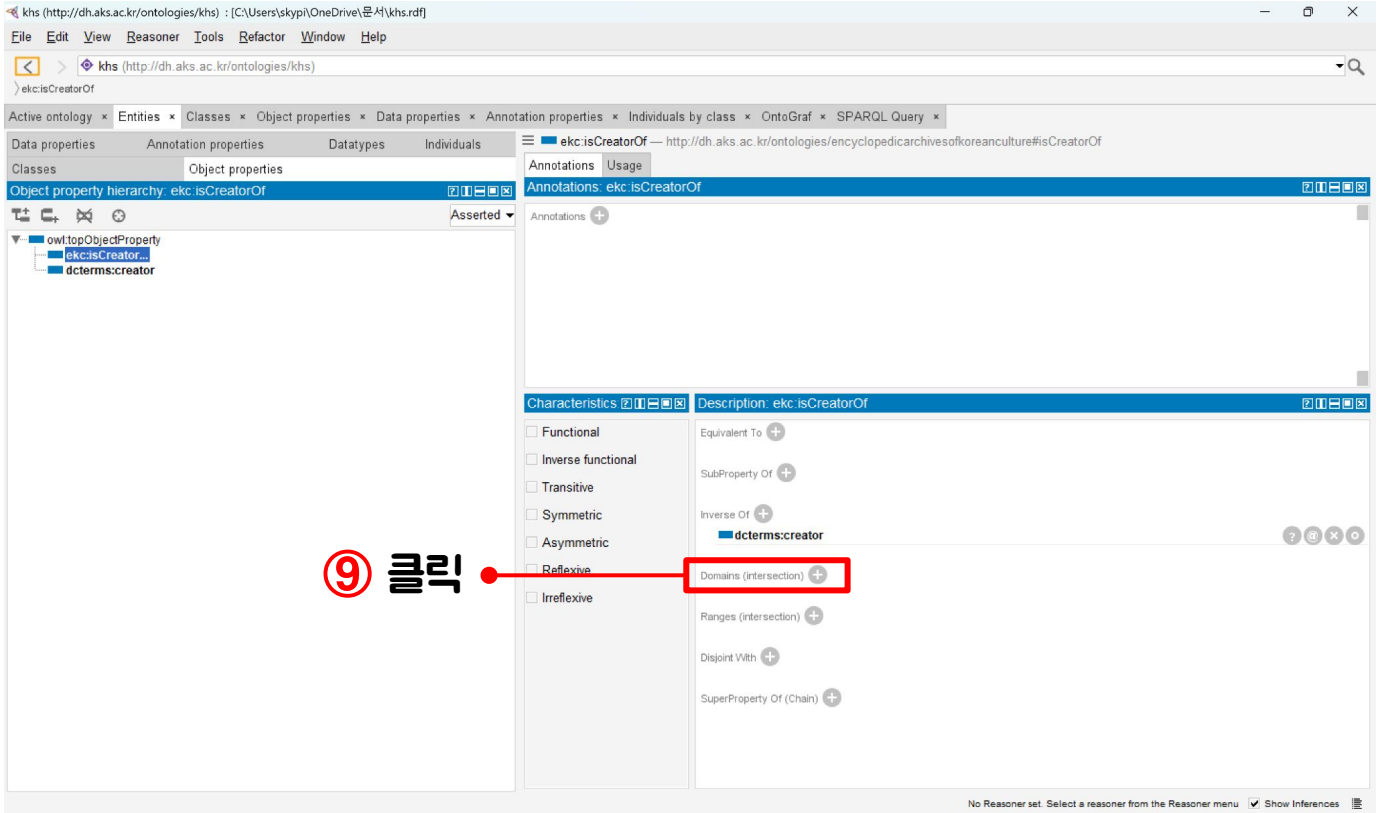
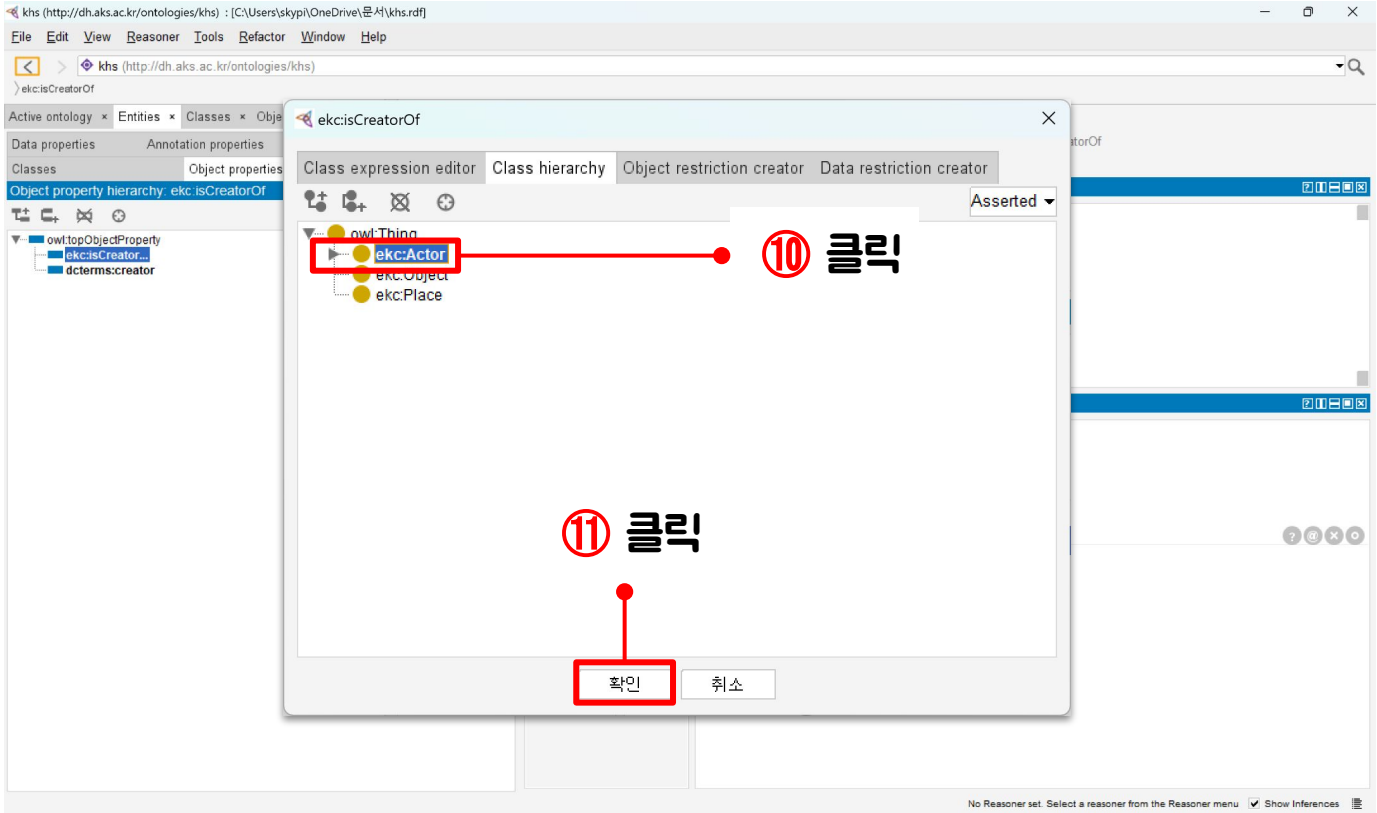


Object properties : 역관계 입력



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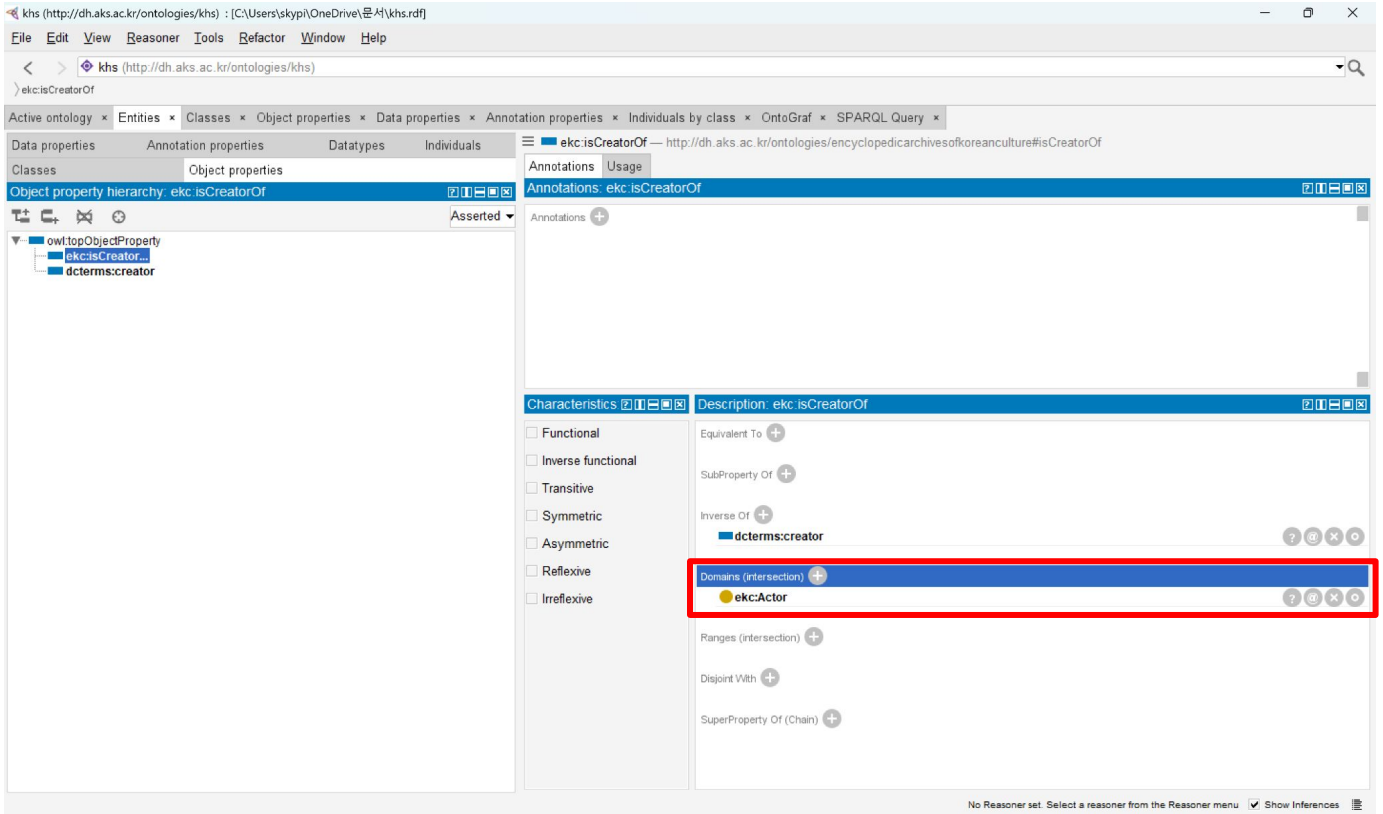

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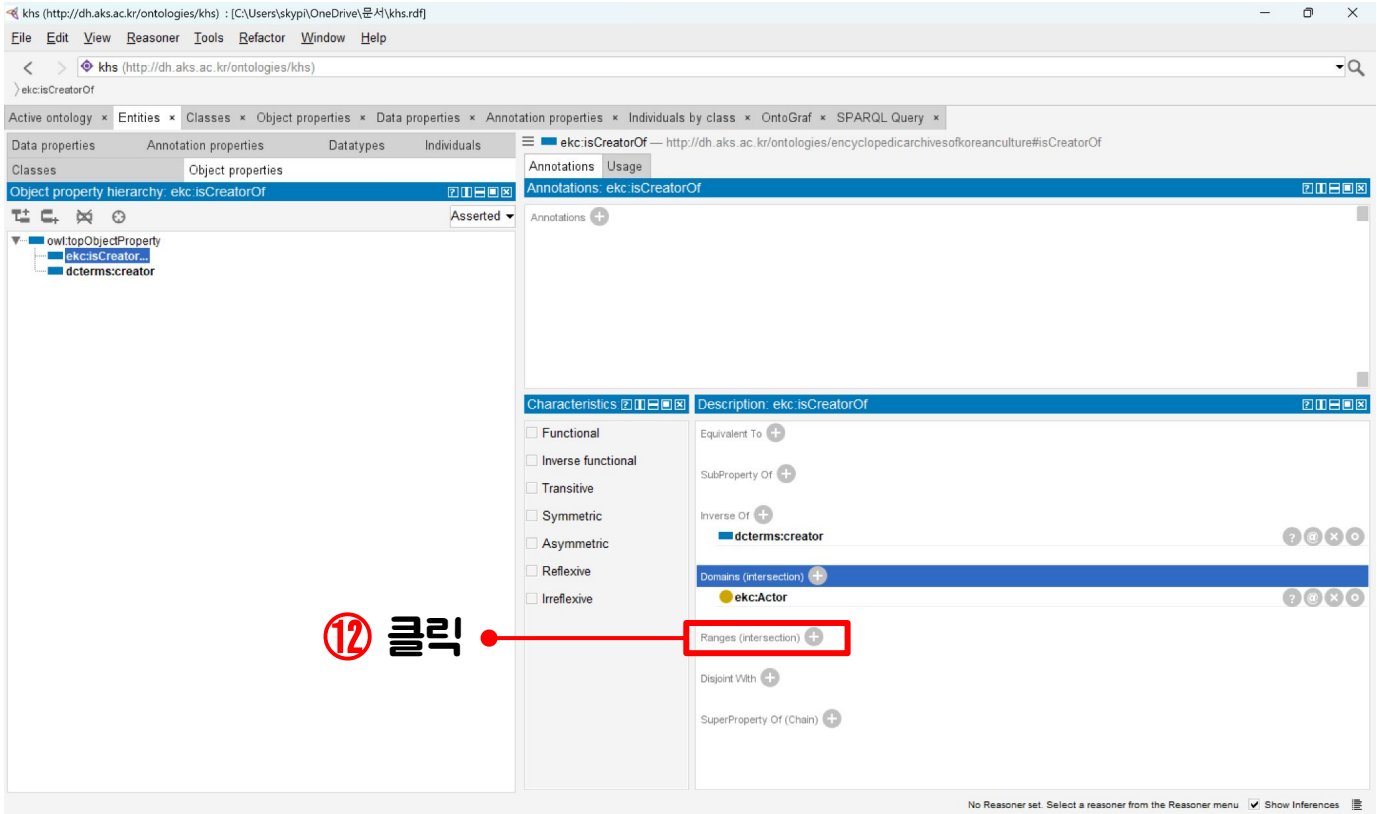
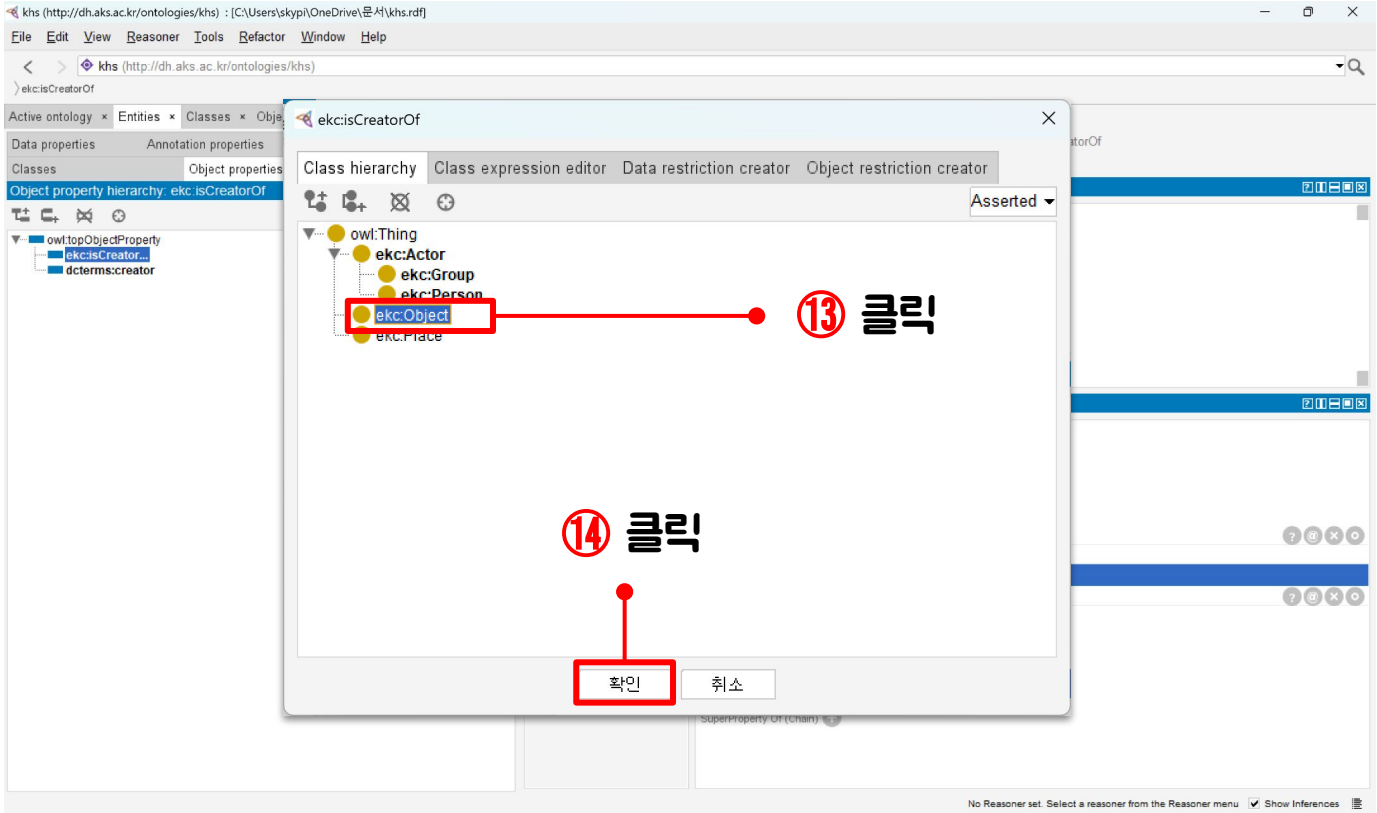
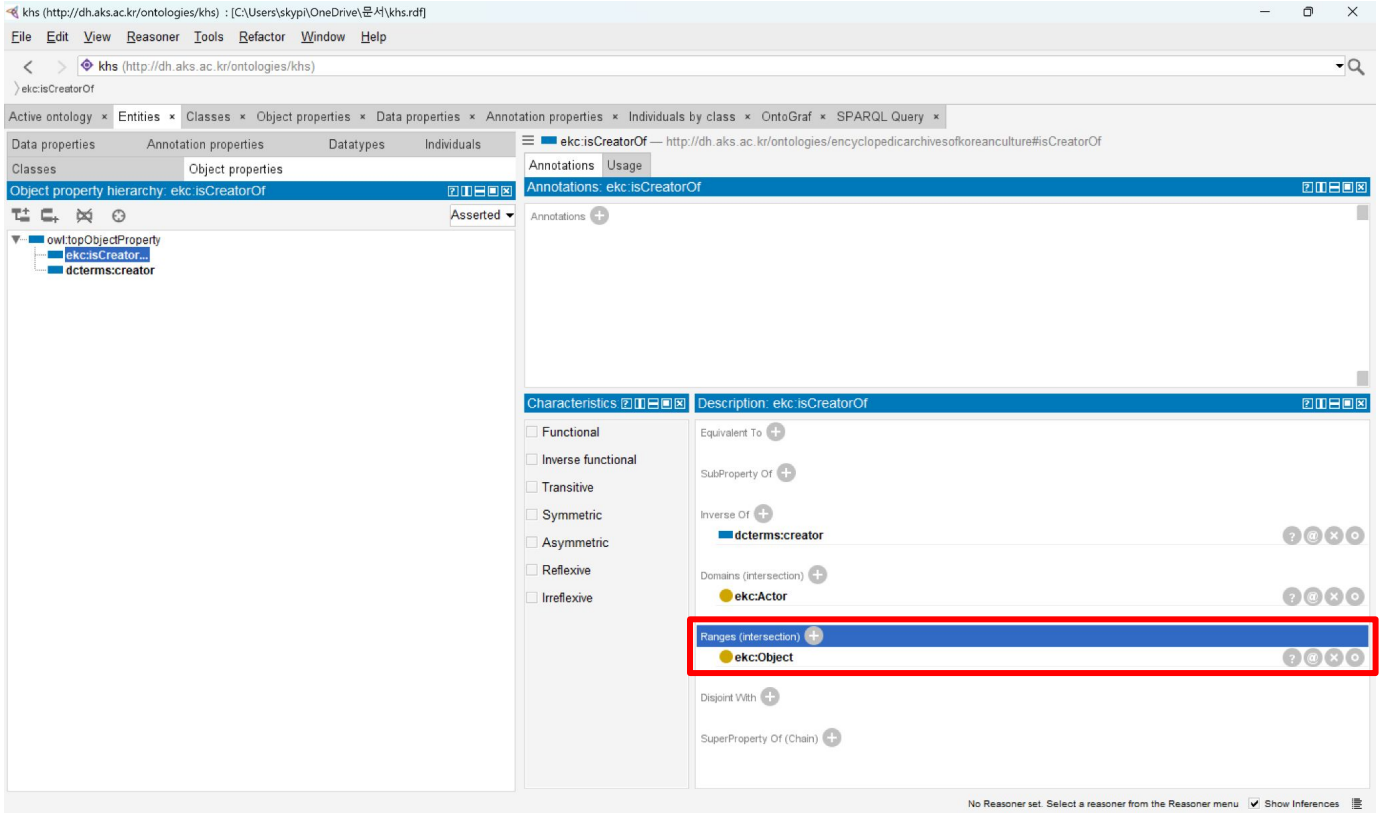


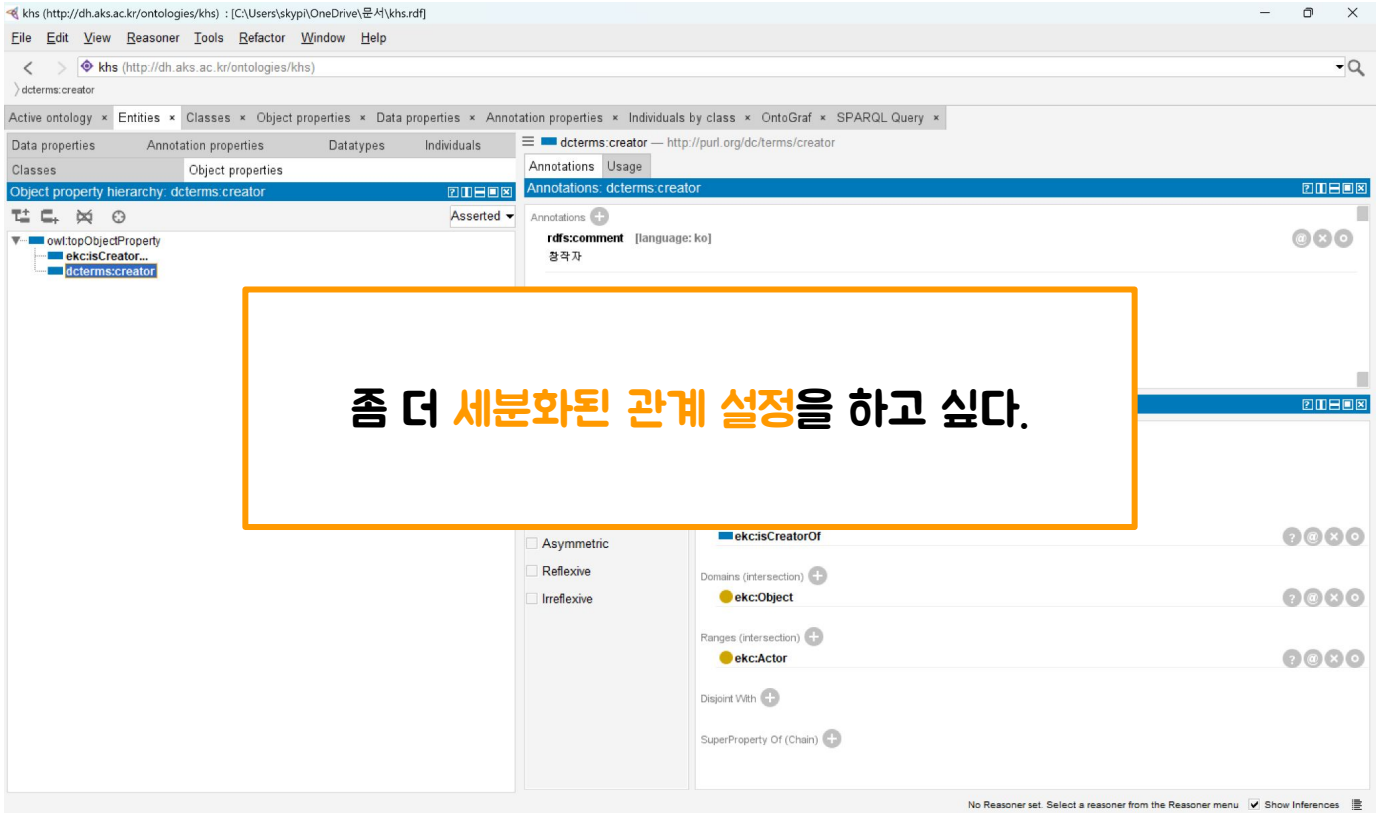
Object properties : 역관계 입력



Object properties : 역관계 입력

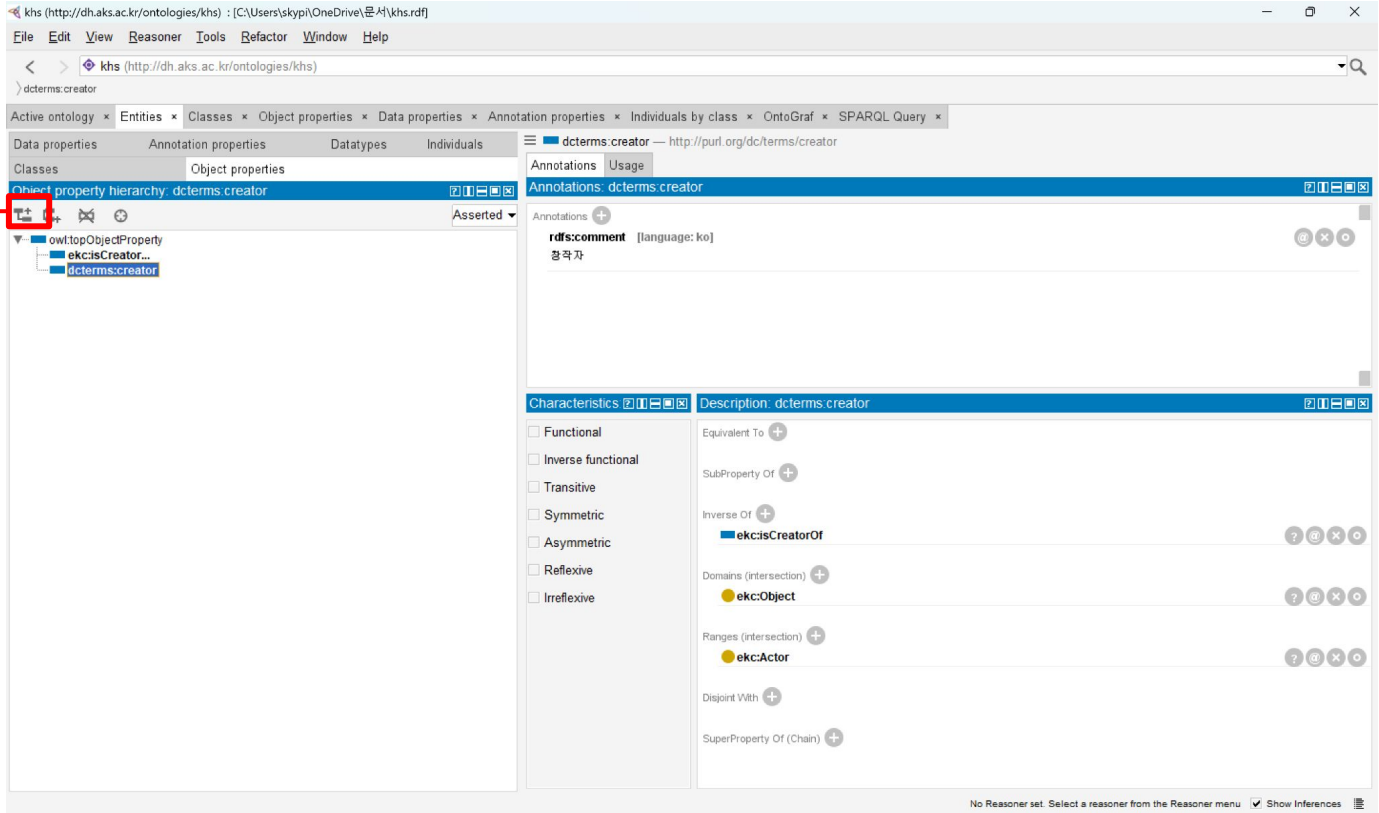


Object properties : 관계 세분화

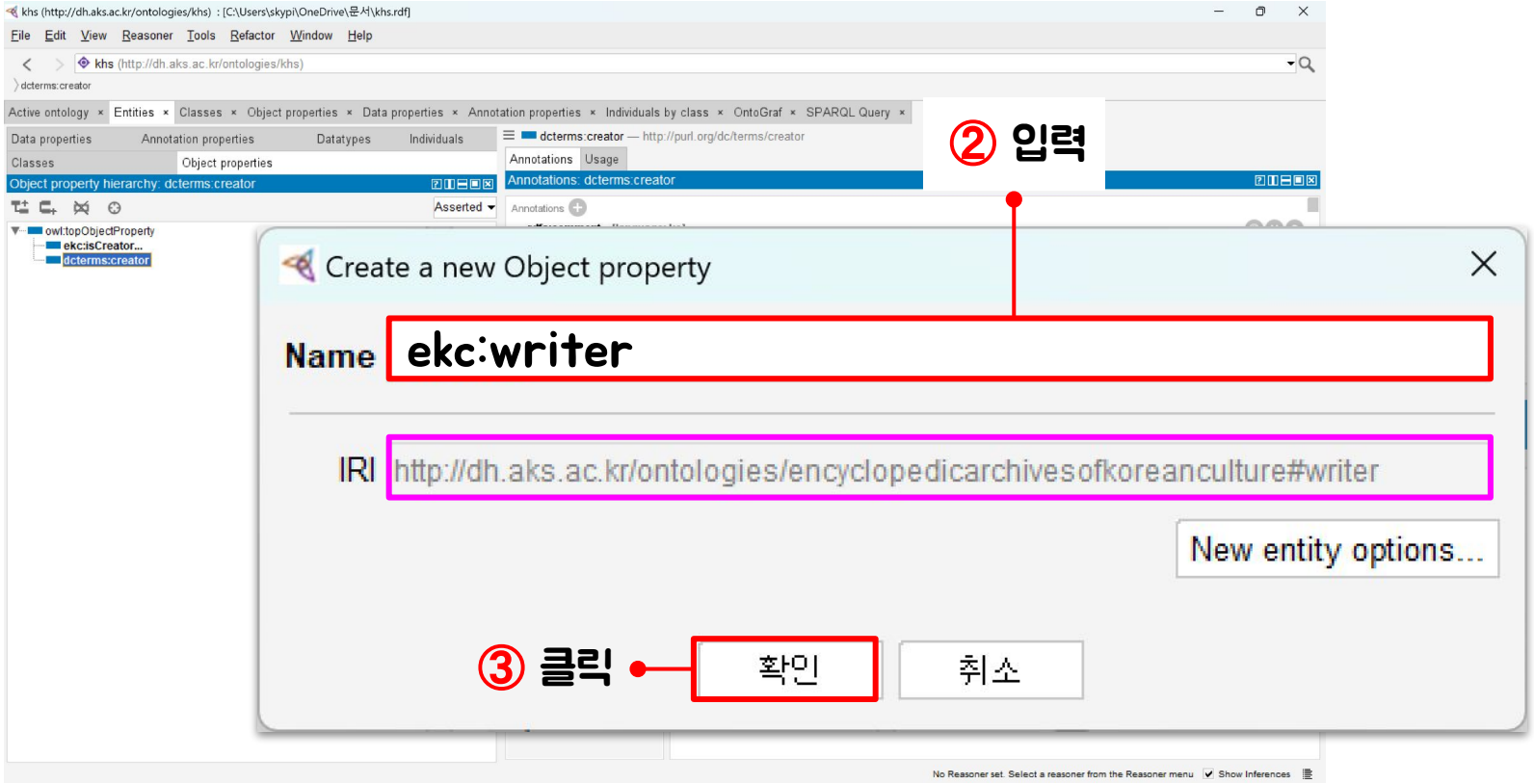


Object properties : 관계 세분화

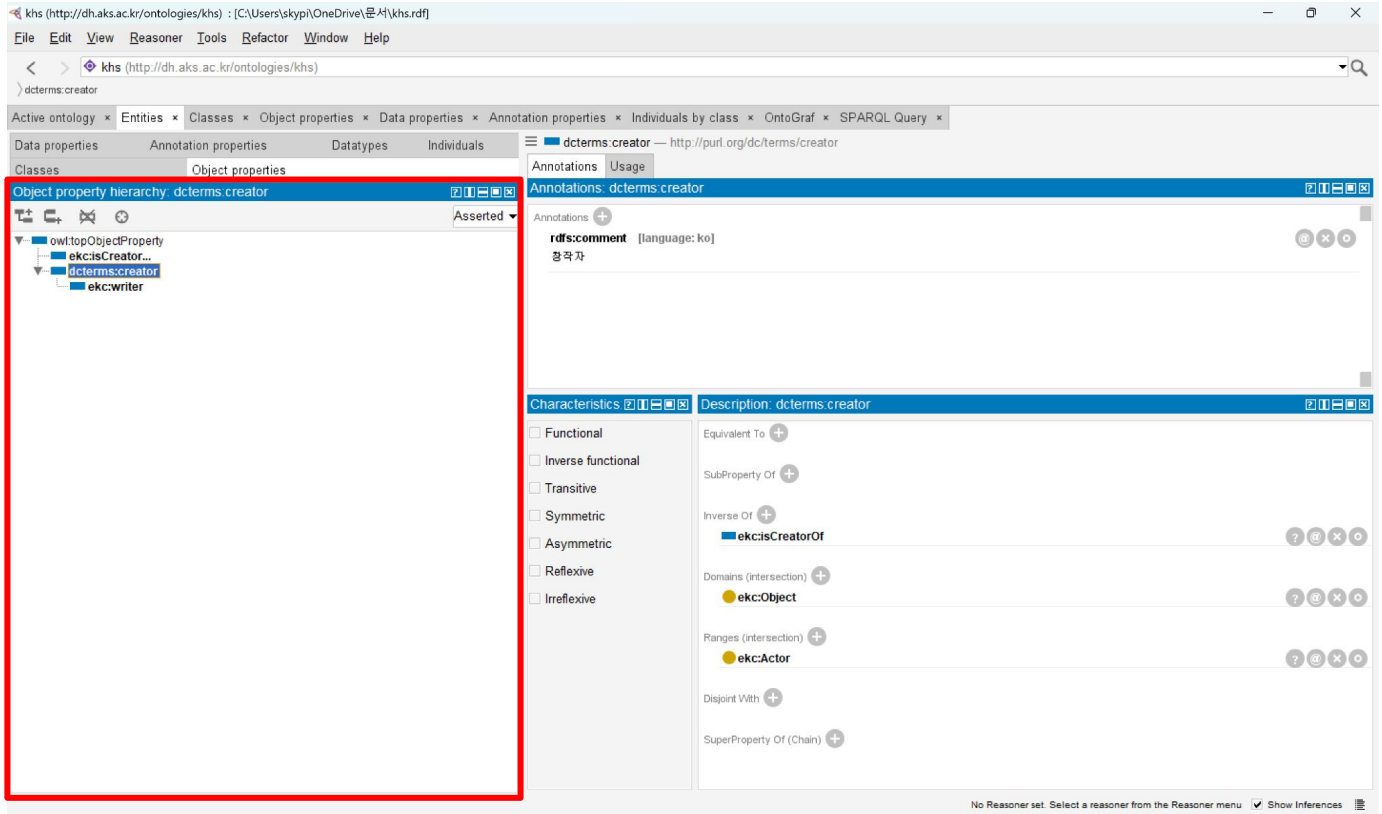
① 클릭



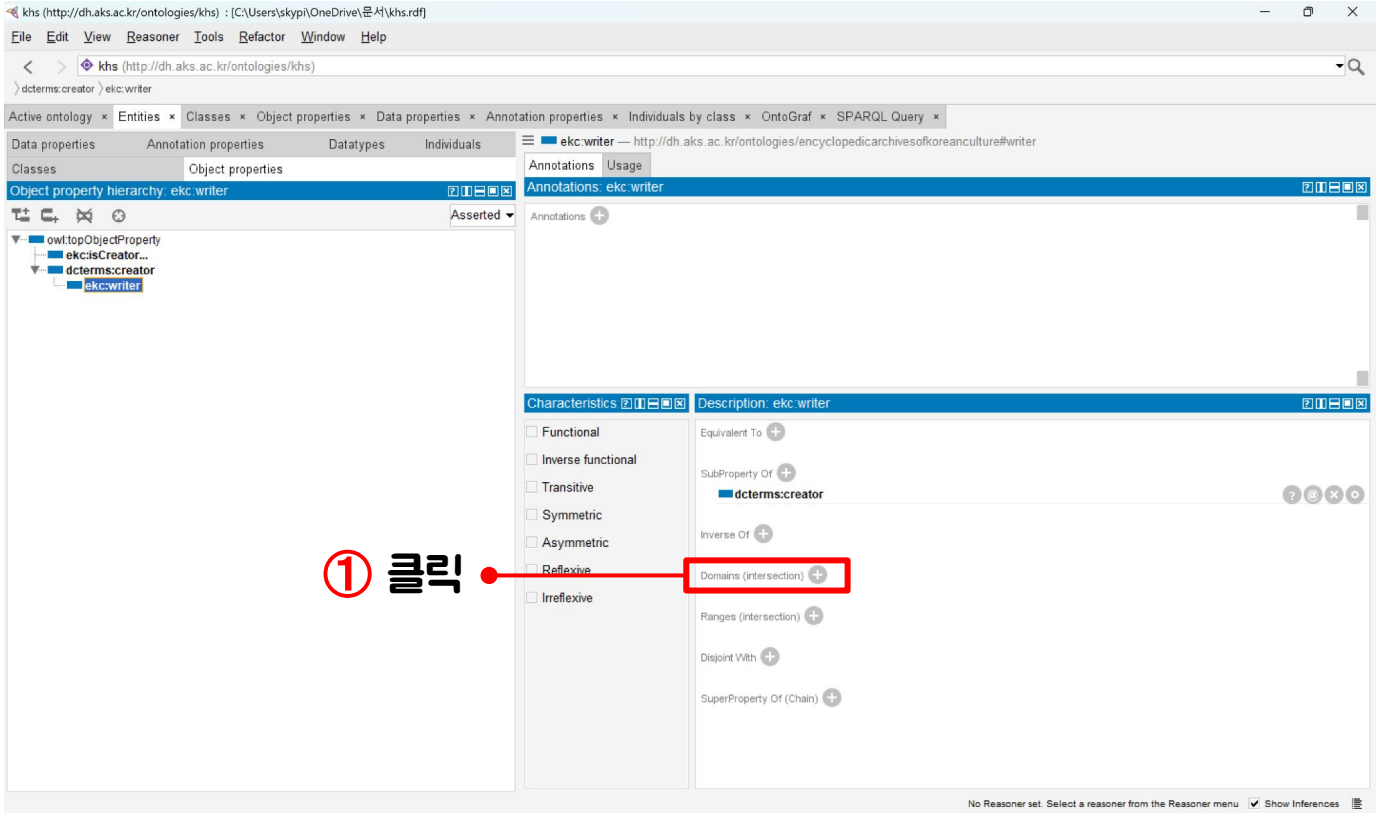
Object properties : 관계 세분화



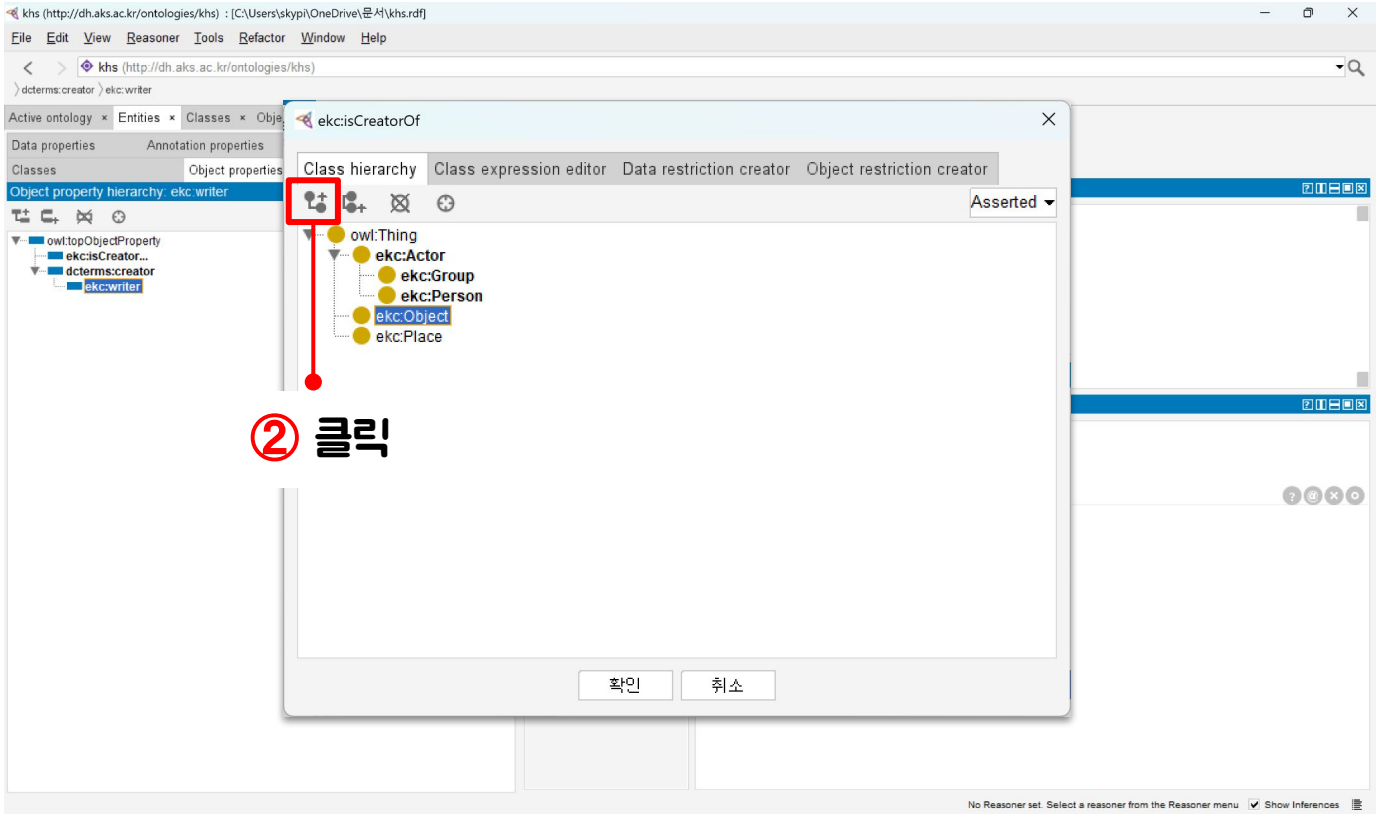
Object properties : 관계 세분화



Object properties : 관계 세분화



Object properties : 관계 세분화



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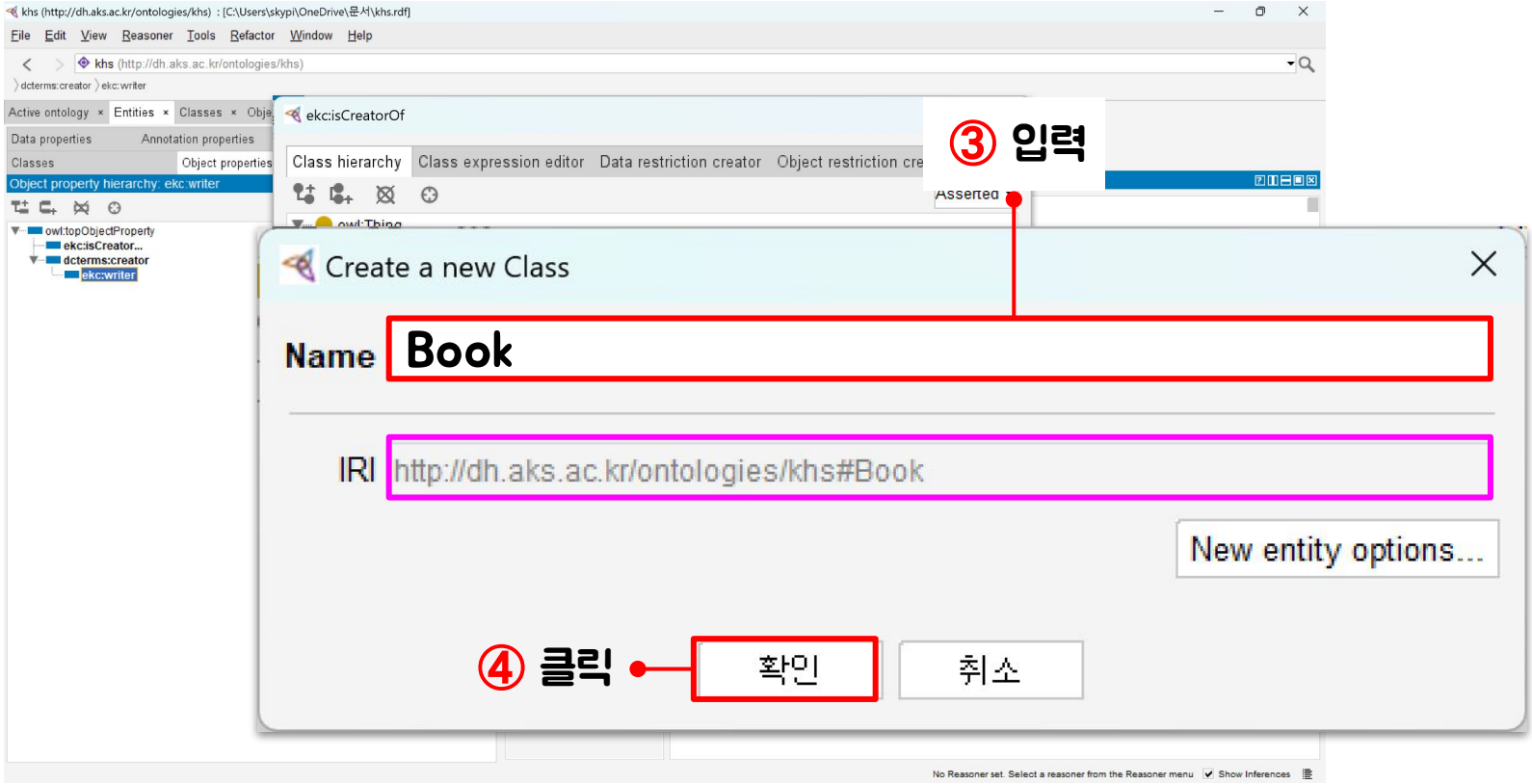
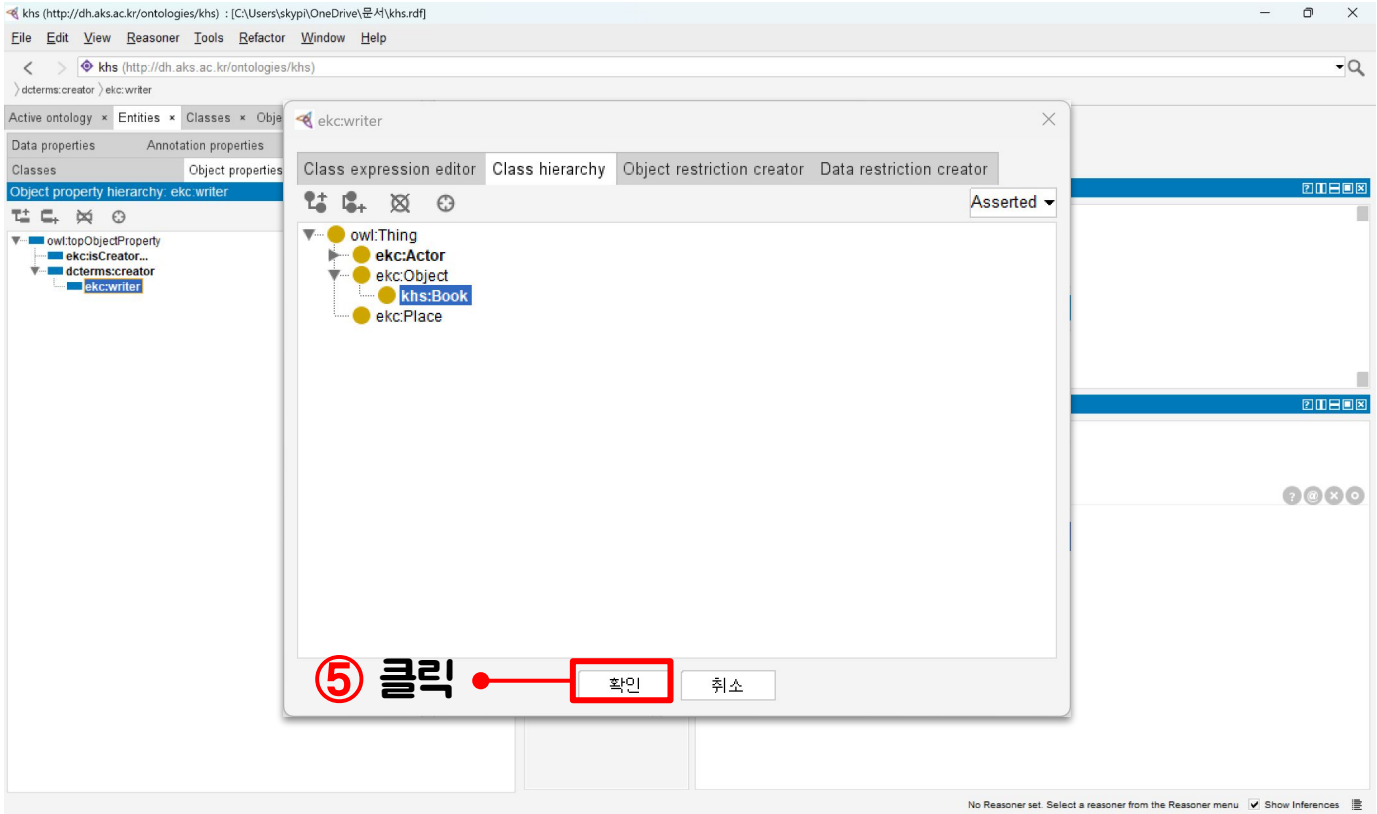
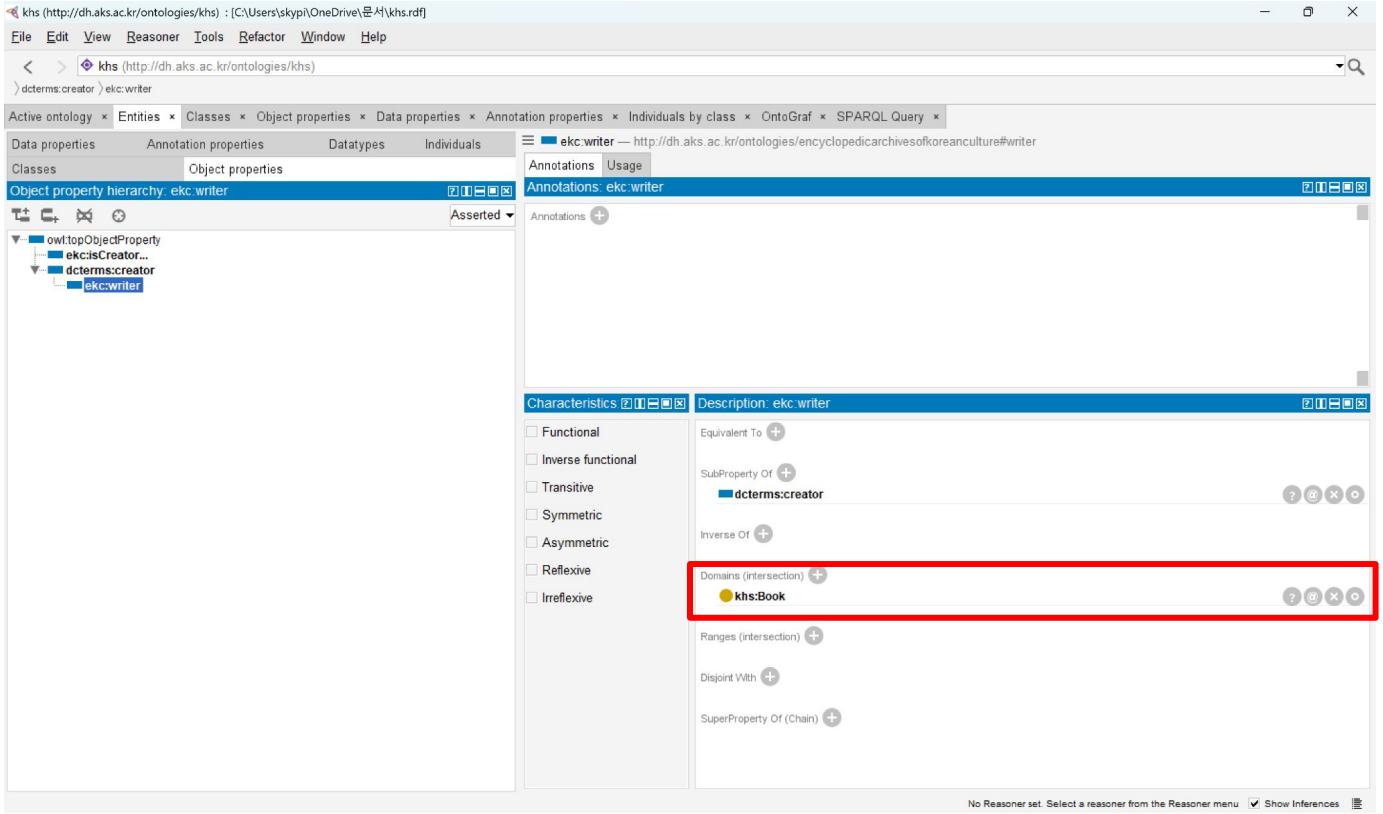


Object properties : 관계 세분화



Object properties : 관계 세분화



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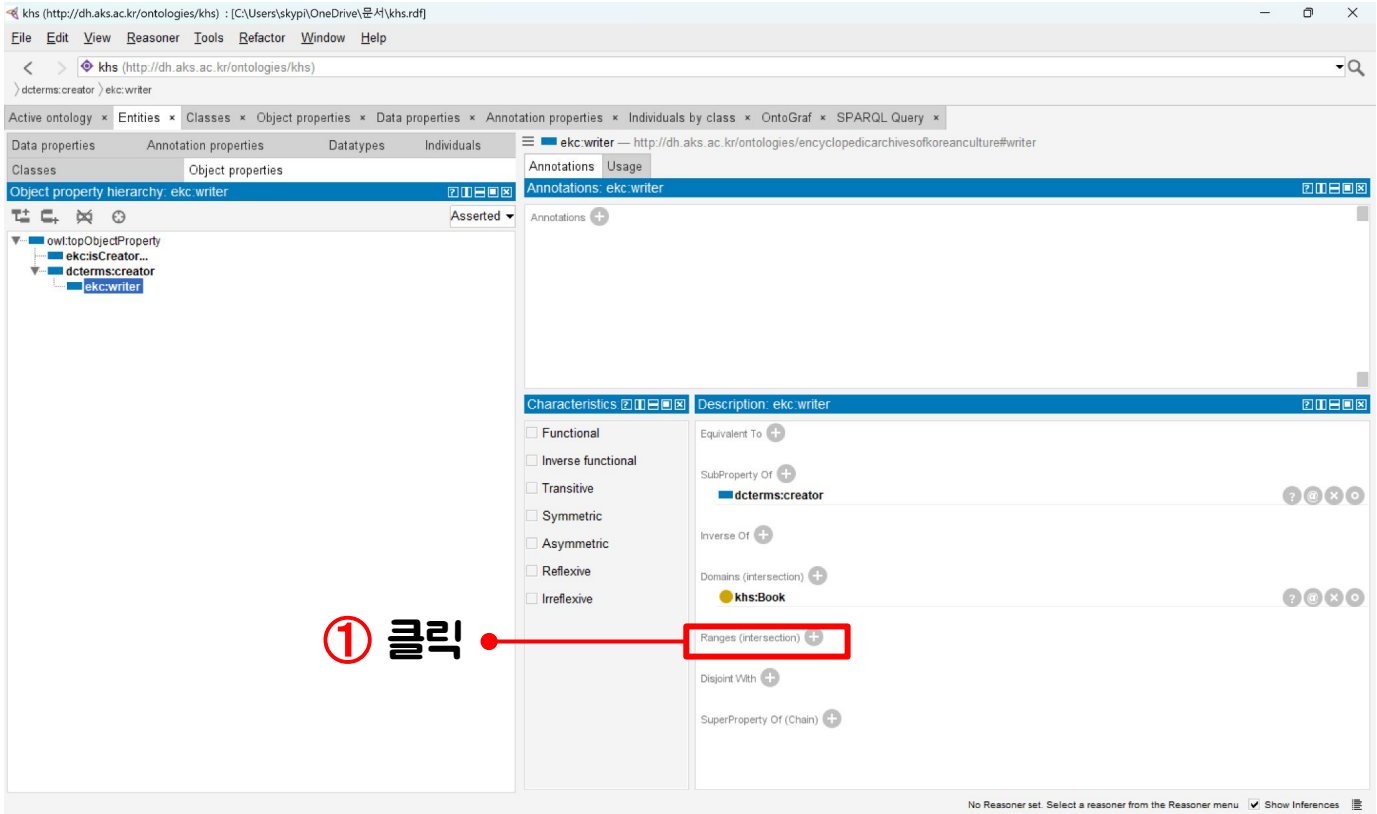
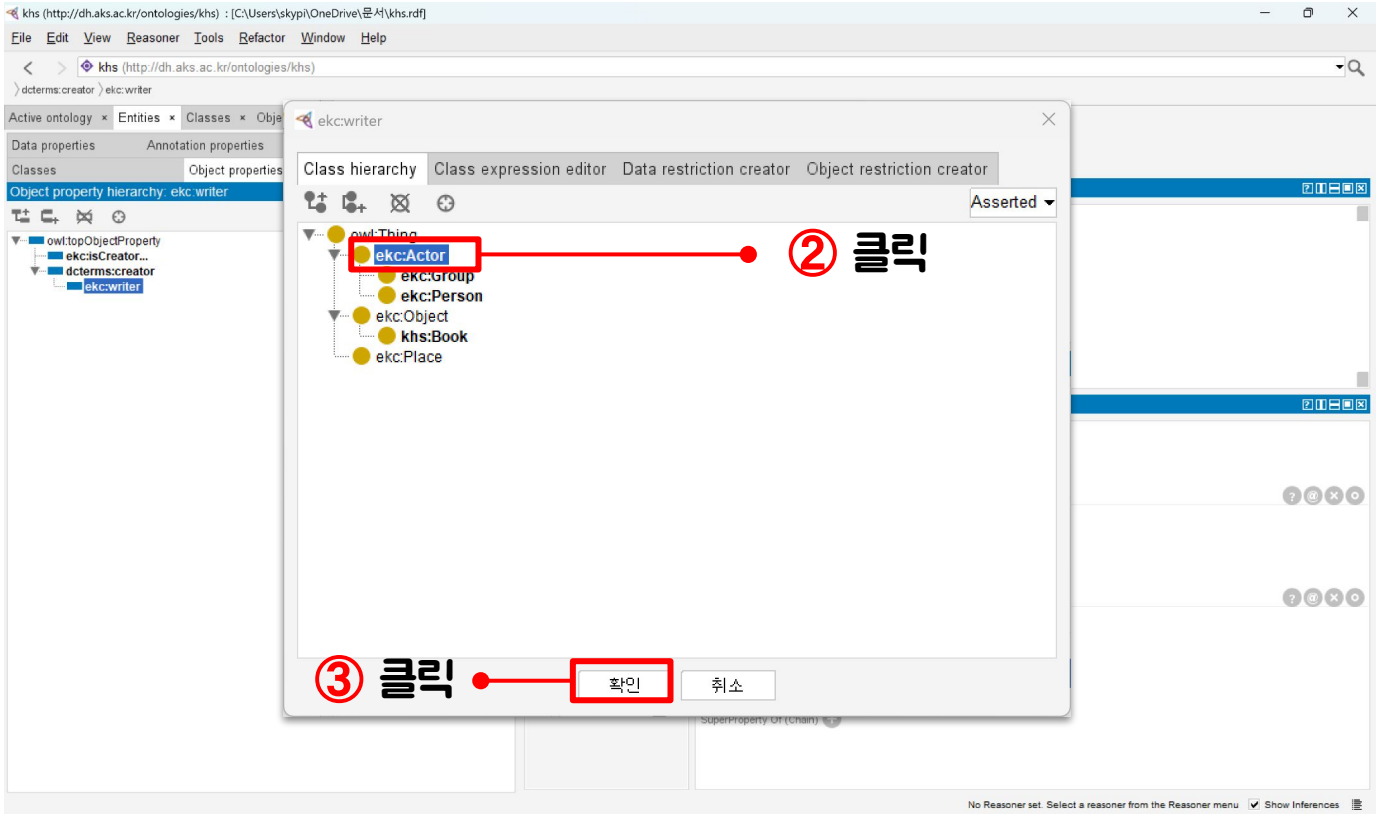
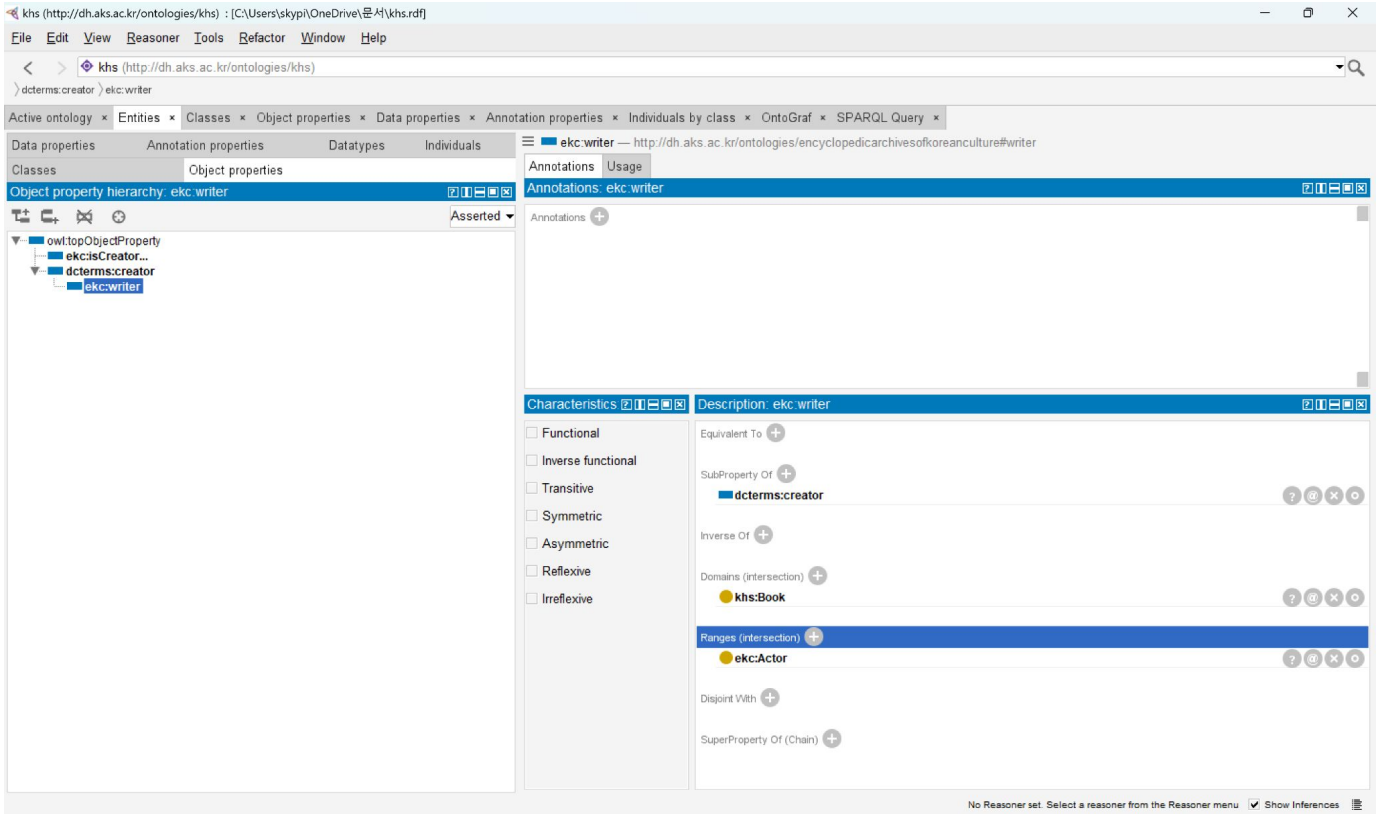


Object properties : 관계 세분화



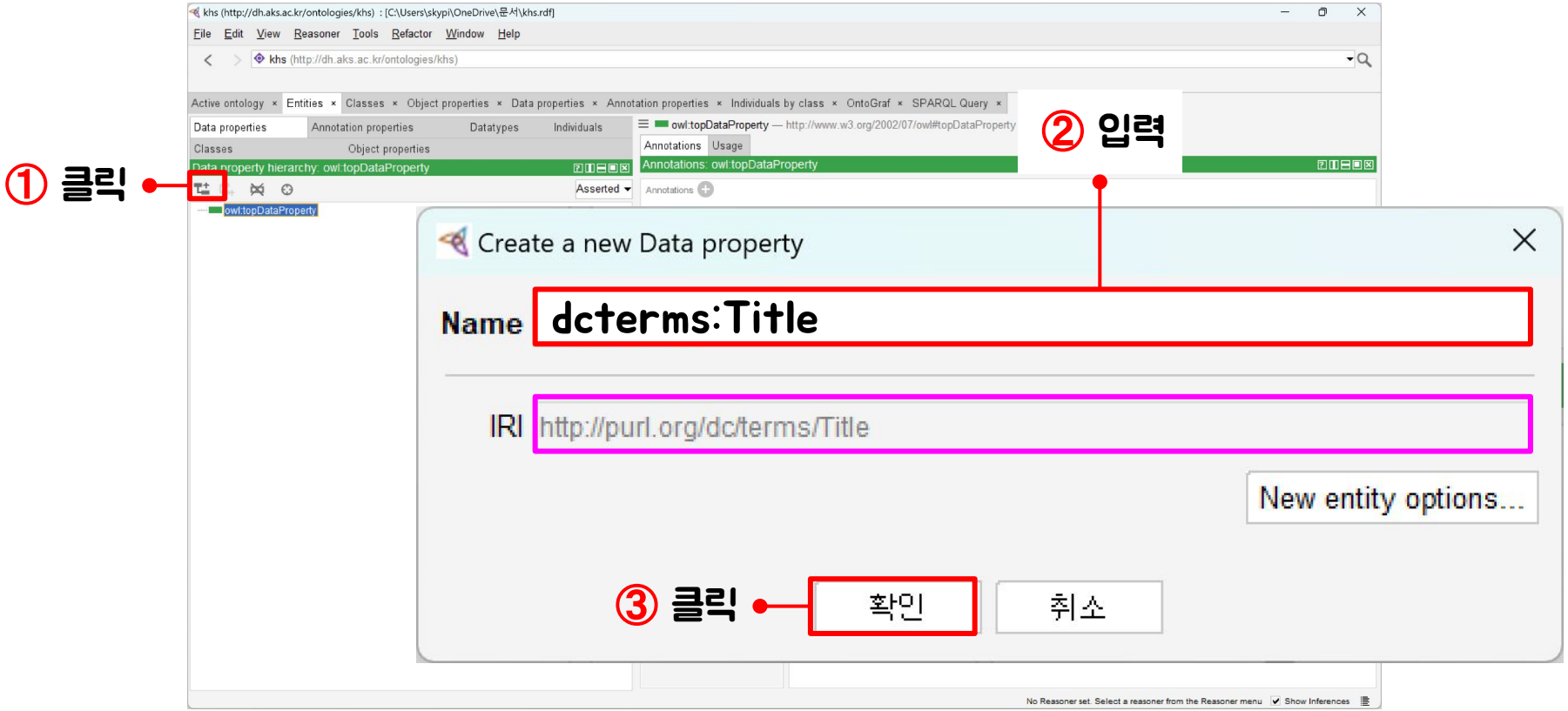
Object properties : 관계 세분화



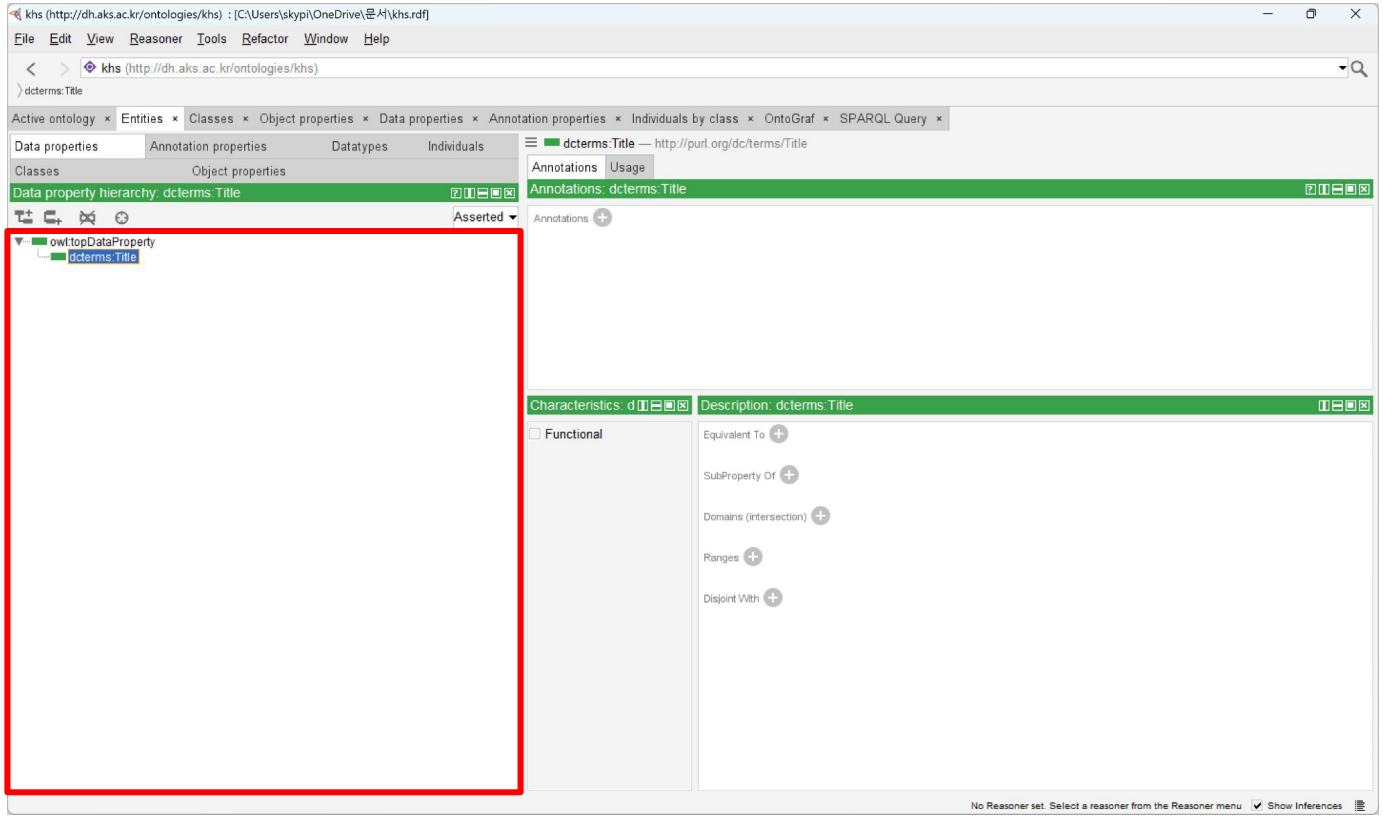
6

프로테제 실습 - Data properties

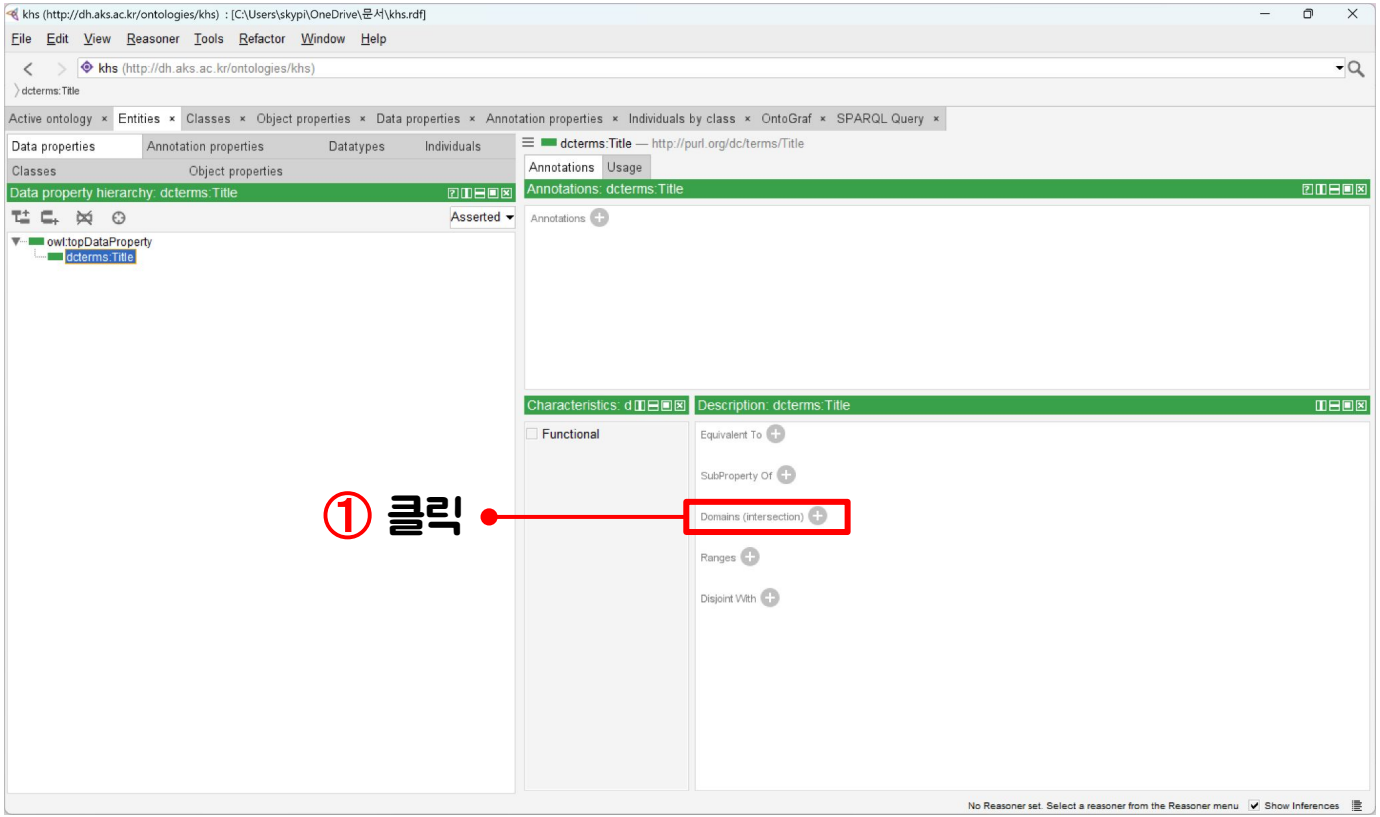
Data properties : 데이터 속성값 입력



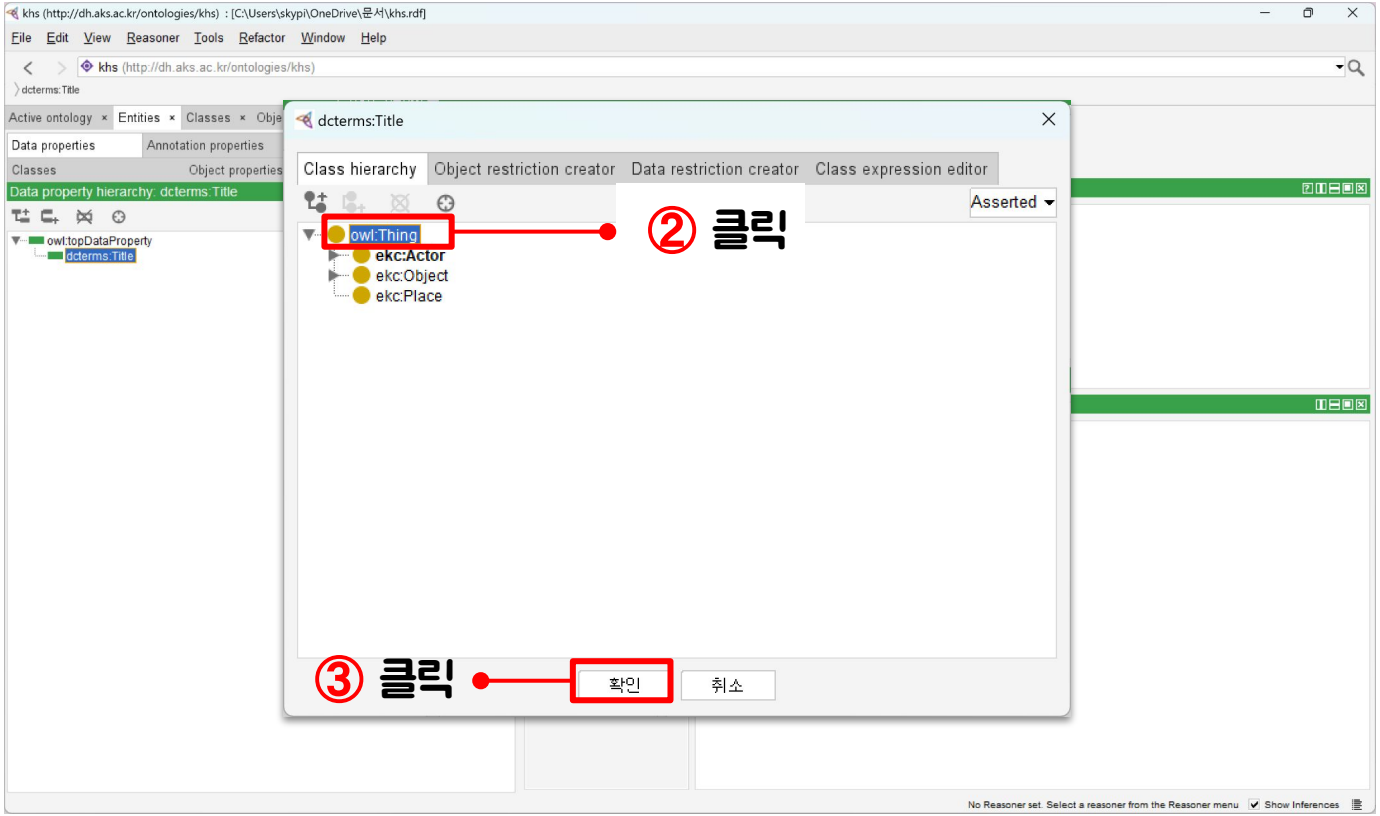
Data properties : 데이터 속성값 입력



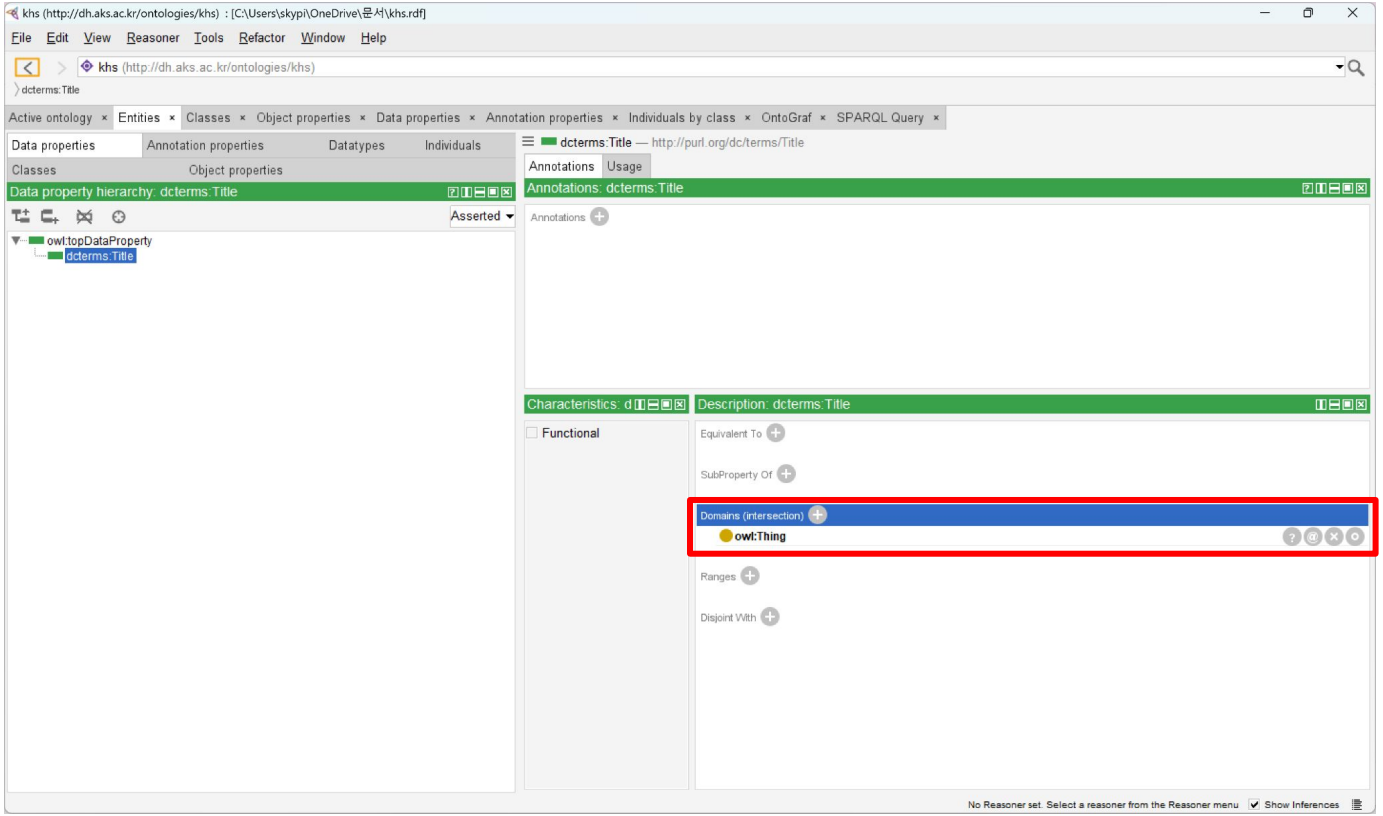
Data properties : 데이터 속성값 입력



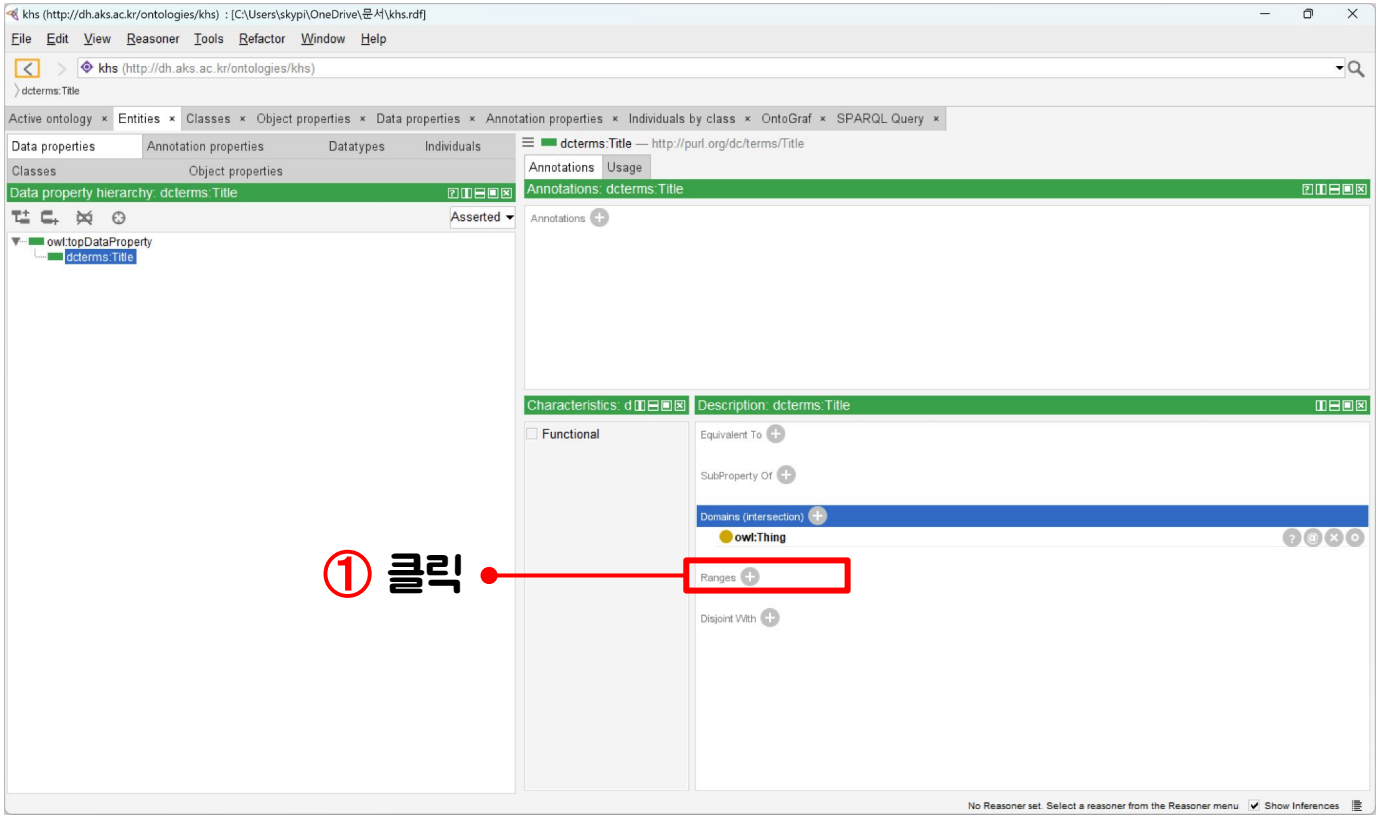
Data properties : 데이터 속성값 입력



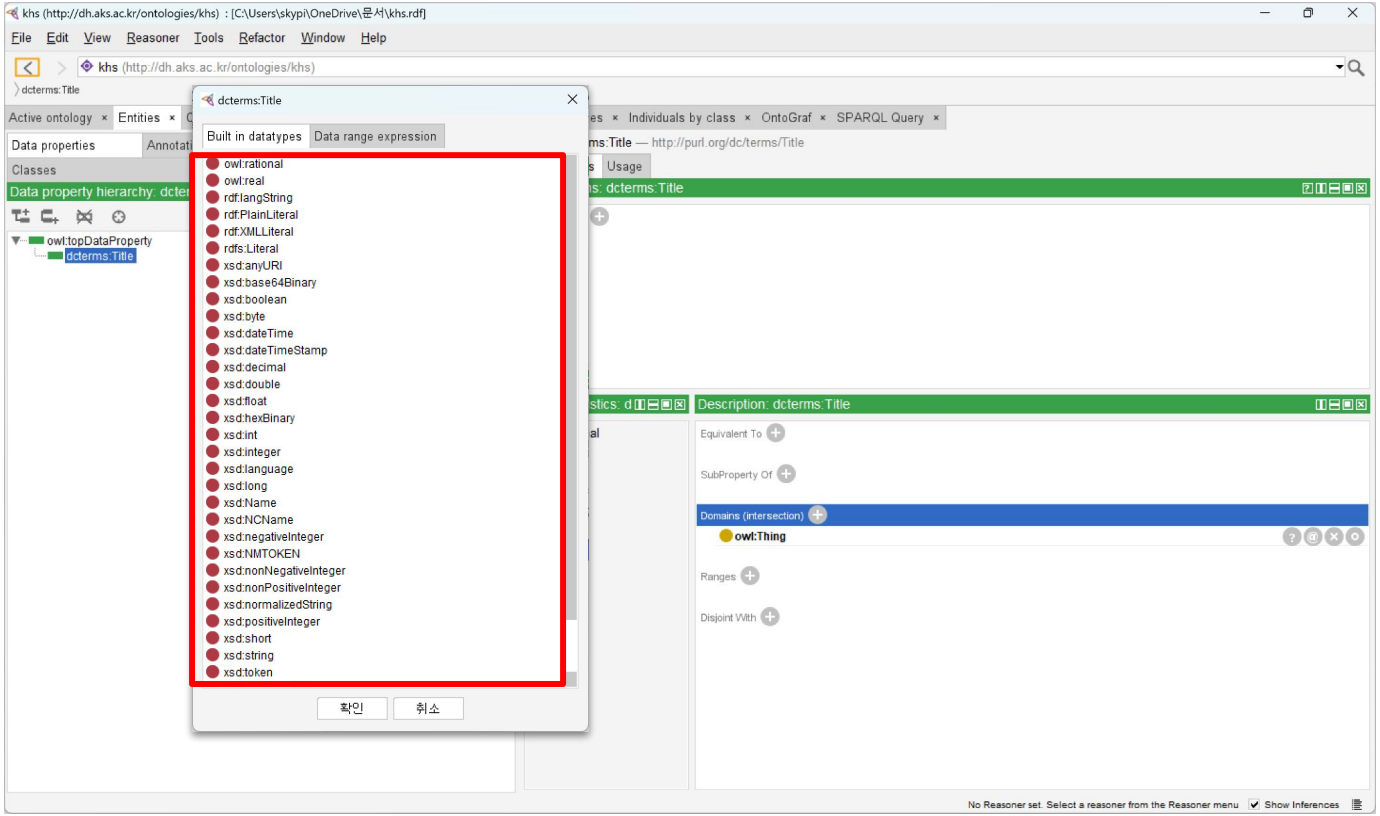
Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



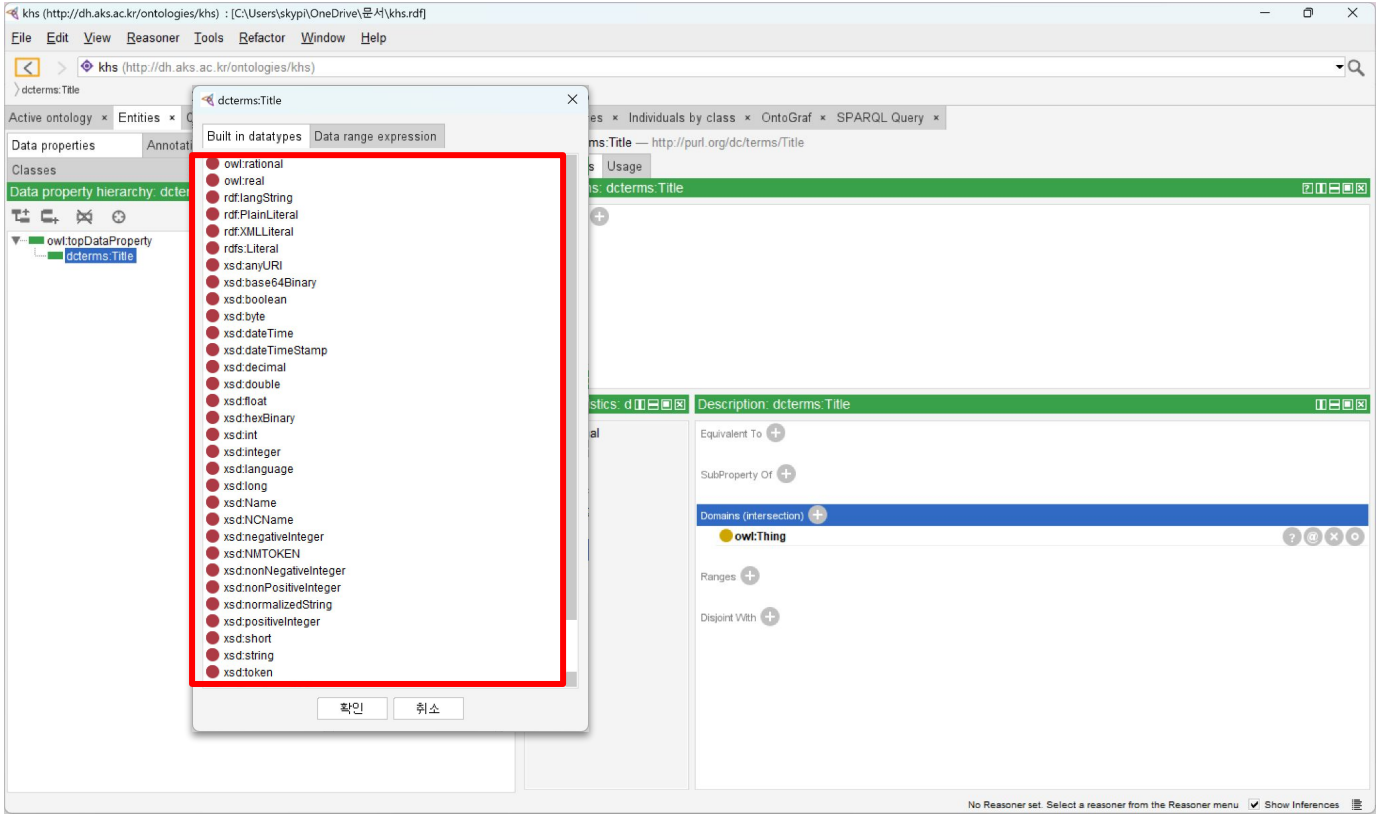
Data properties : 데이터 속성값 입력



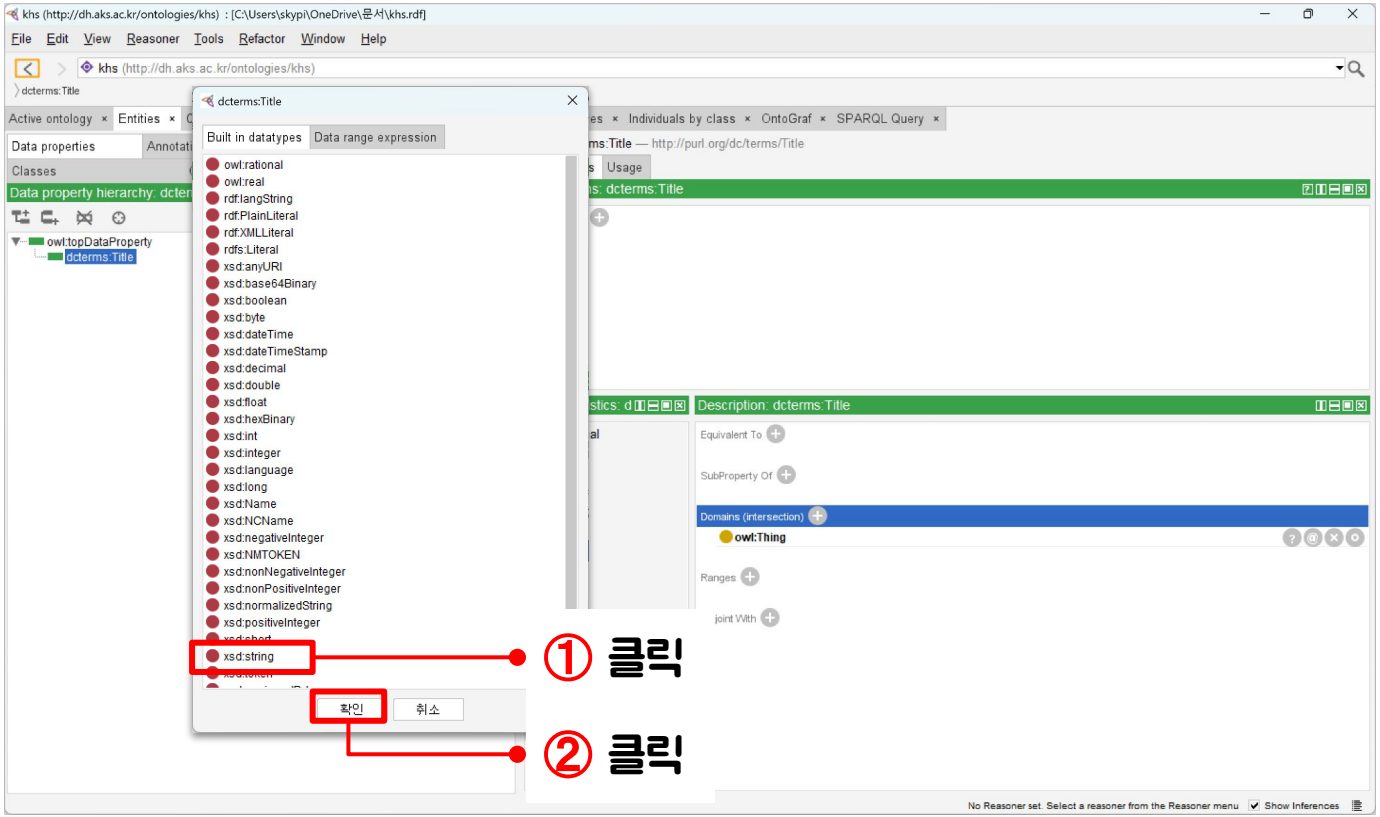
※ Data Types

데이터 유형	설명
rdfs:Literal	문자
xsd:float	실수
xsd:dateTime	날짜
xsd:int / xsd:integer	숫자
xsd:string	문자
xsd:anyURI	다른 곳의 고유한 id 값을 사용 할 때 연결시키기 위해 사용

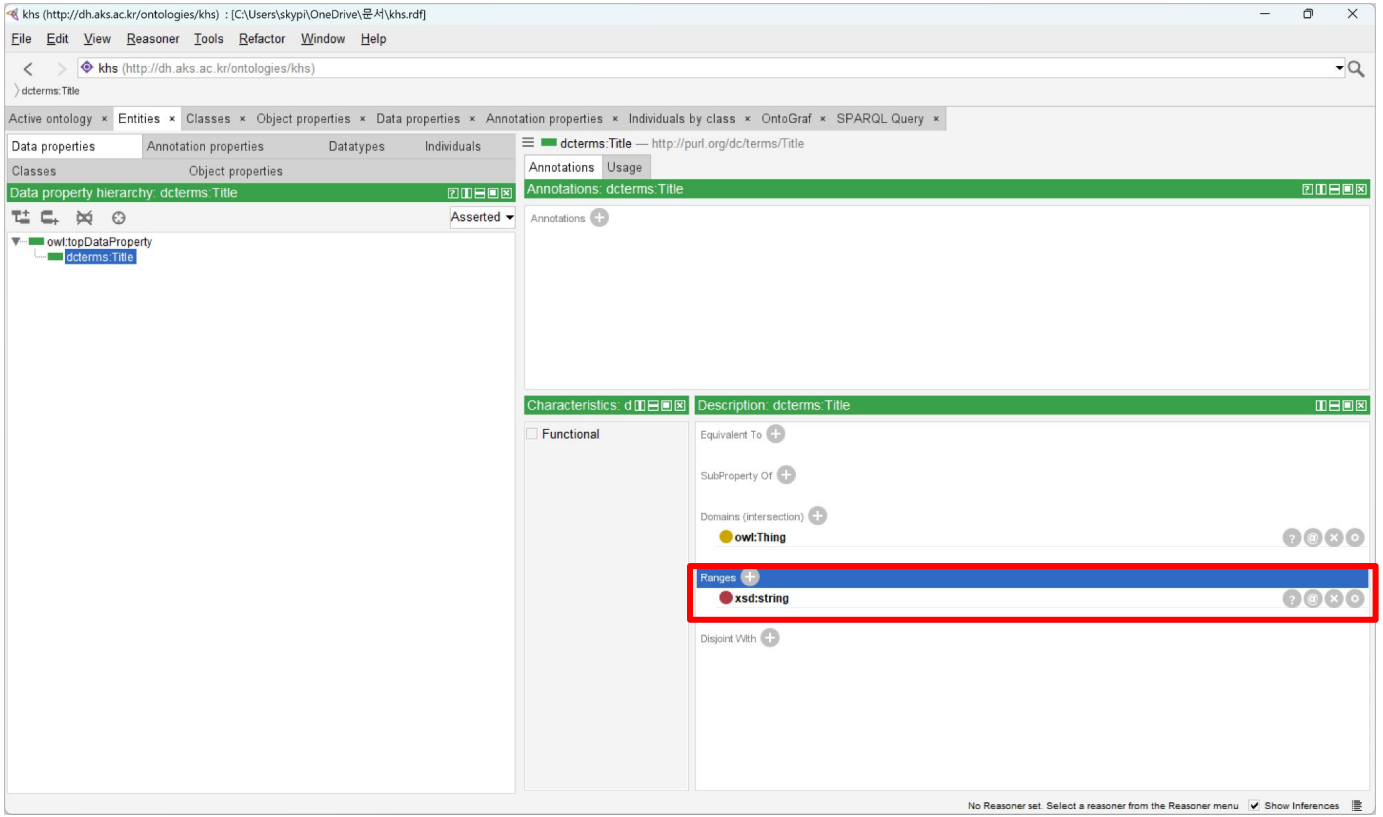
Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



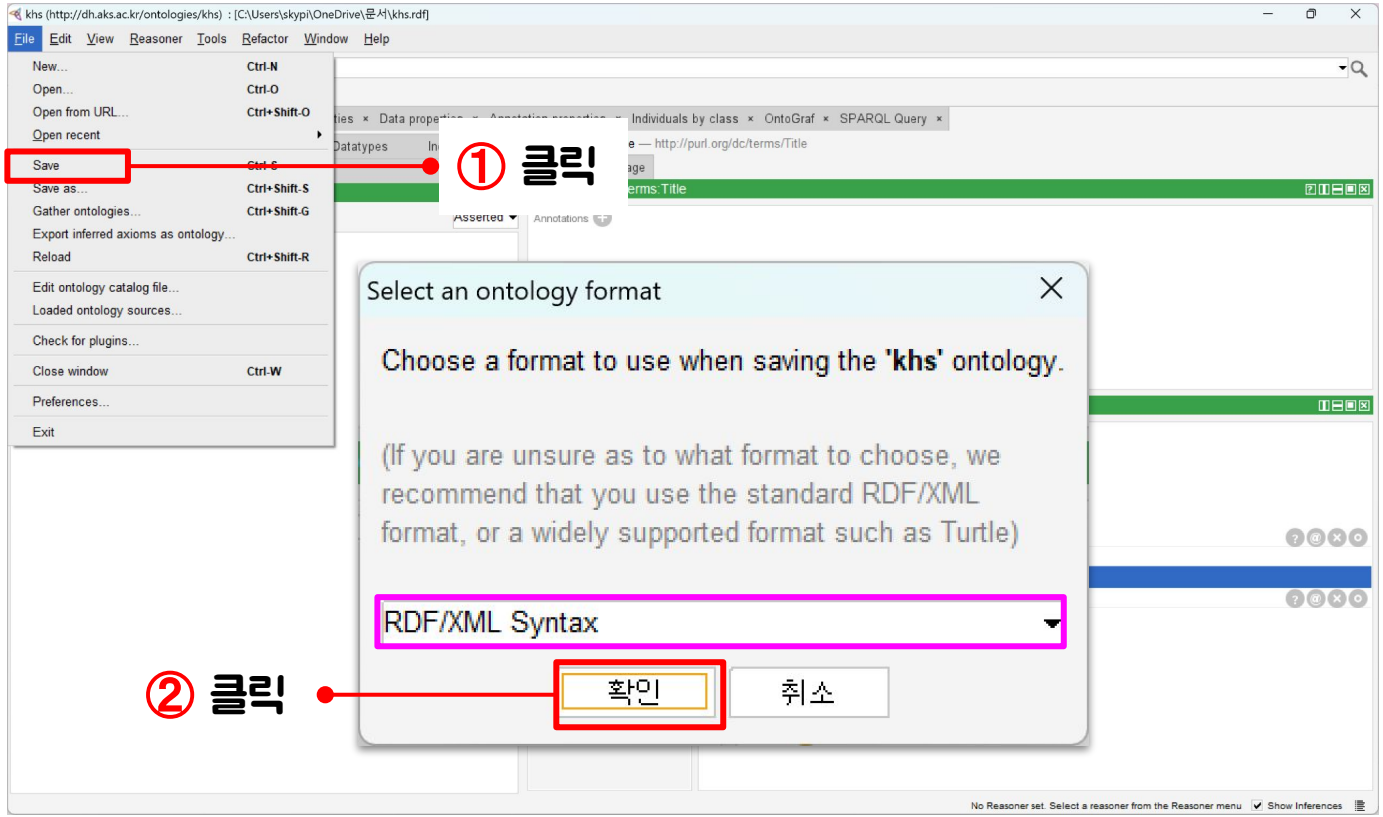
Data properties : 데이터 속성값 입력



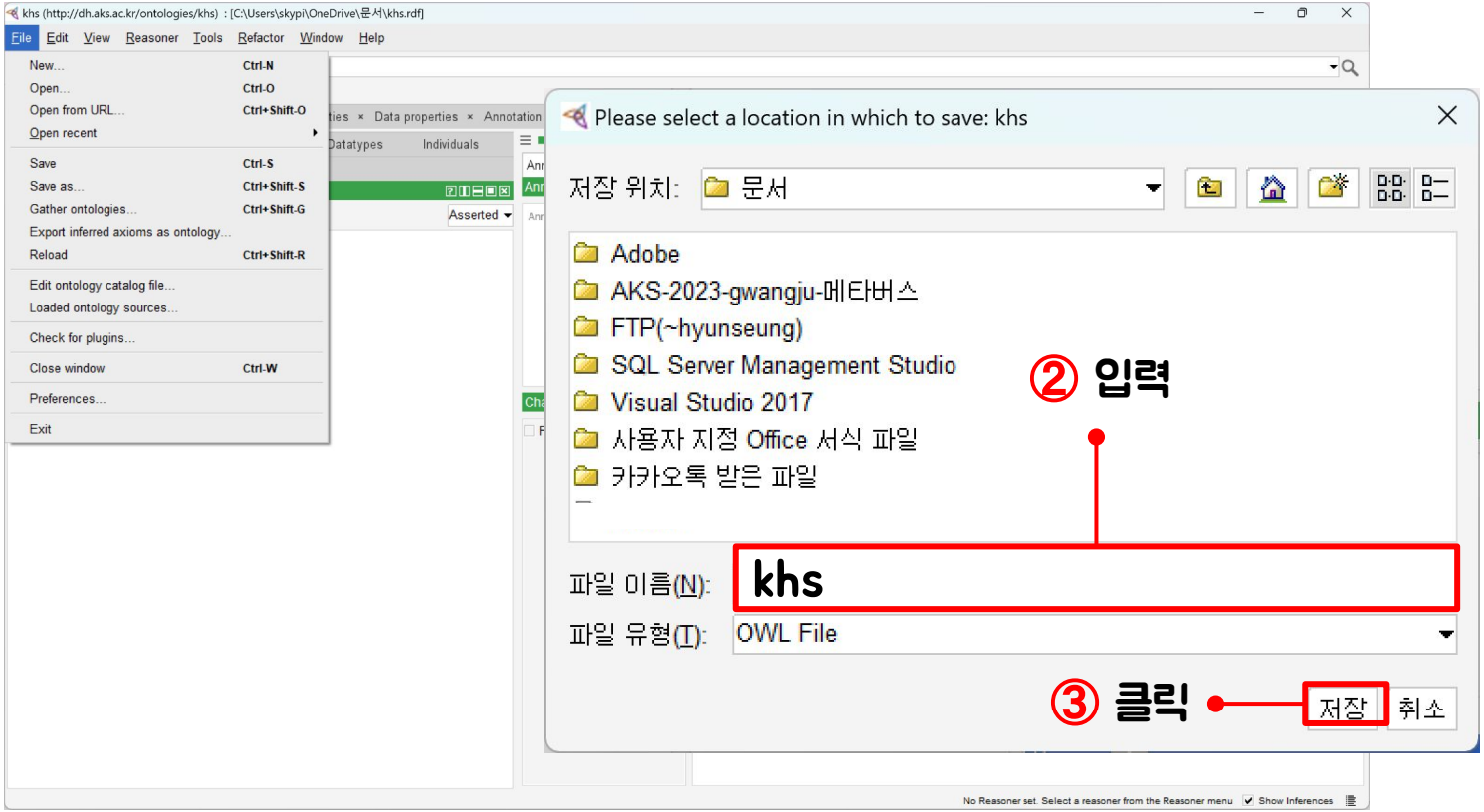
7

프로테제 실습 - 마무리

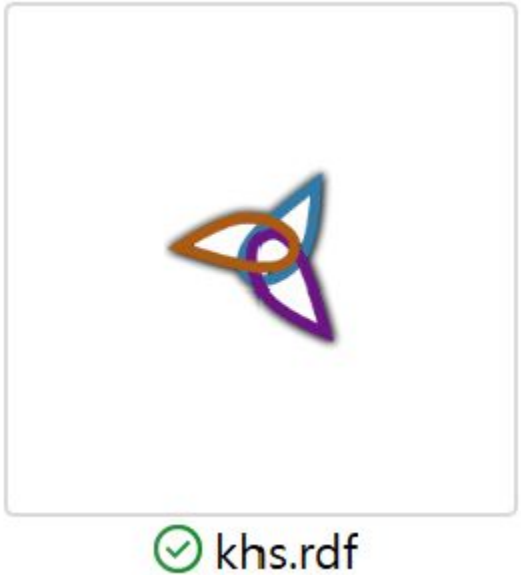
마무리 : 파일 저장


File Edit View Reasoner Tools Refactor Window Help
New... Ctrl-N
Open... Ctrl-O
Open from URL... Ctrl+Shift-O
Open recent
Save Ctrl-S
Save as... Ctrl+Shift-S
Gather ontologies... Ctrl+Shift-G
Export inferred axioms as ontology...
Reload Ctrl+Shift-R
Edit ontology catalog file...
Loaded ontology sources...
Check for plugins...
Close window Ctrl-W
Preferences...
Exit
① 클릭
Select an ontology format
Choose a format to use when saving the 'khs' ontology.
(If you are unsure as to what format to choose, we recommend that you use the standard RDF/XML format, or a widely supported format such as Turtle)
RDF/XML Syntax
② 클릭
확인
취소

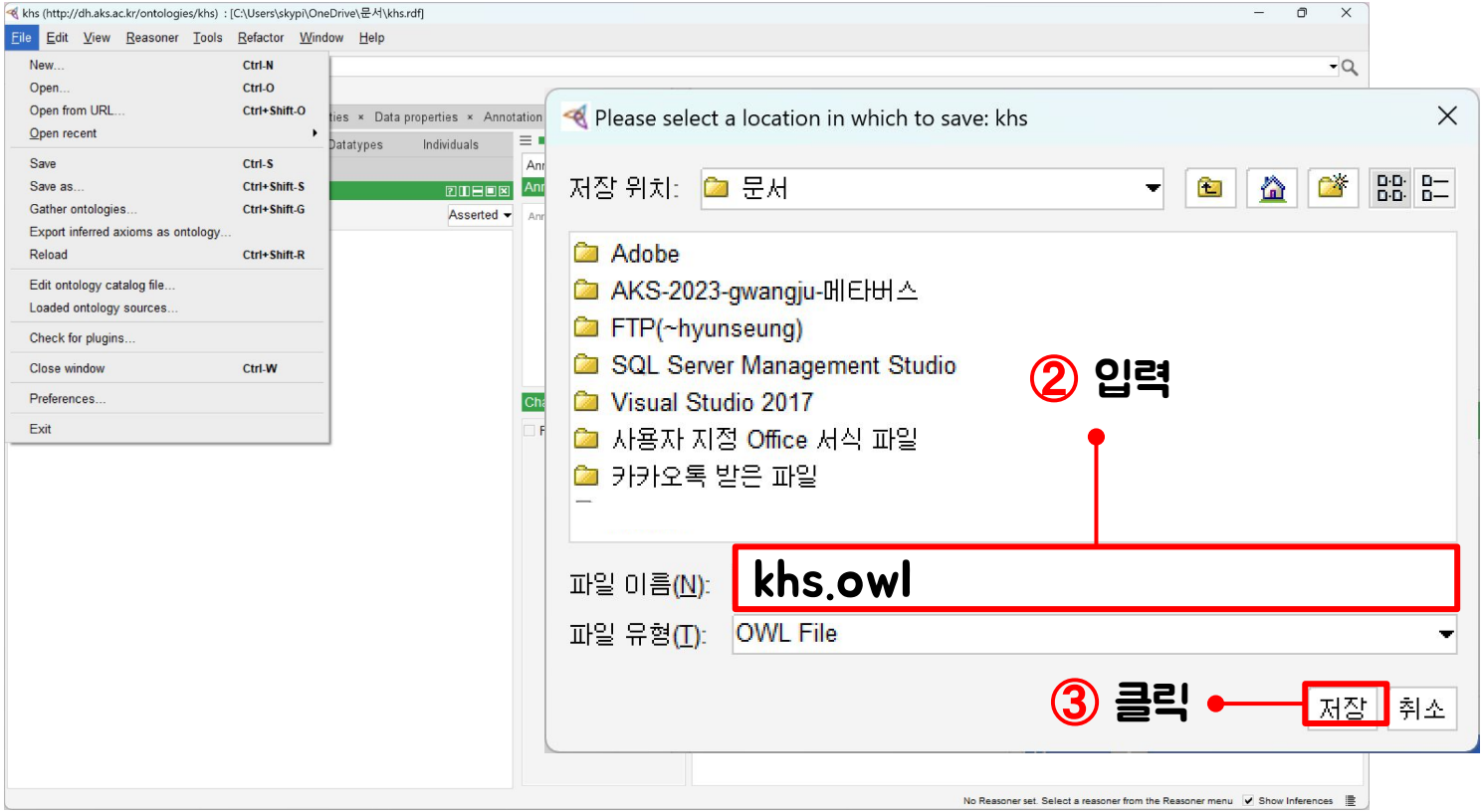
마무리 : 파일 저장


File Edit View Reasoner Tools Refactor Window Help
New... Ctrl-N
Open... Ctrl-O
Open from URL... Ctrl+Shift-O
Open recent
Save Ctrl-S
Save as... Ctrl+Shift-S
Gather ontologies... Ctrl+Shift-G
Export inferred axioms as ontology...
Reload Ctrl+Shift-R
Edit ontology catalog file...
Loaded ontology sources...
Check for plugins...
Close window Ctrl-W
Preferences...
Exit
Please select a location in which to save: khs
저장 위치: 문서
Adobe
AKS-2023-gwangju-메타버스
FTP(~hyunseung)
SQL Server Management Studio
Visual Studio 2017
사용자 지정 Office 서식 파일
카카오톡 받은 파일
② 입력
파일 이름(N): khs
파일 유형(T): OWL File
③ 클릭
저장
취소

마무리 : 파일 저장

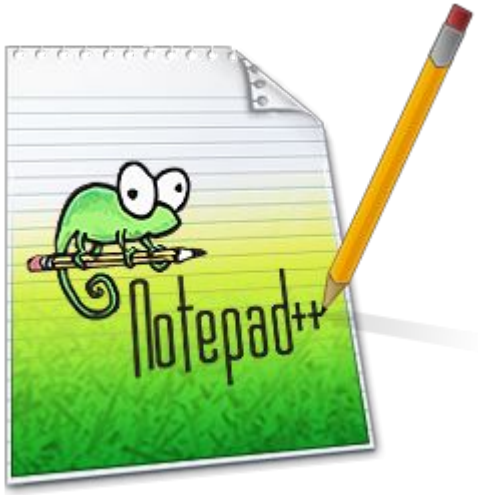


마무리 : 파일 저장


File Edit View Reasoner Tools Refactor Window Help
New... Ctrl-N
Open... Ctrl-O
Open from URL... Ctrl+Shift-O
Open recent
Save Ctrl-S
Save as... Ctrl+Shift-S
Gather ontologies... Ctrl+Shift-G
Export inferred axioms as ontology...
Reload Ctrl+Shift-R
Edit ontology catalog file...
Loaded ontology sources...
Check for plugins...
Close window Ctrl-W
Preferences...
Exit
Please select a location in which to save: khs
저장 위치: 문서
Adobe
AKS-2023-gwangju-메타버스
FTP(~hyunseung)
SQL Server Management Studio
Visual Studio 2017
사용자 지정 Office 서식 파일
카카오톡 받은 파일
② 입력
파일 이름(N): khs.owl
파일 유형(T): OWL File
③ 클릭
저장
취소

마무리 : 파일 저장

※ 프로그램 다운로드



❖ 노트패드++(Notepad++)

: 문서 편집기이자 소스 코드 편집기

❖ 파일질라(FileZilla)

: 서버 및 클라이언트 양자 사이의 FTP 프로토콜에 의한 파일 전송을 지원하는 소프트웨어

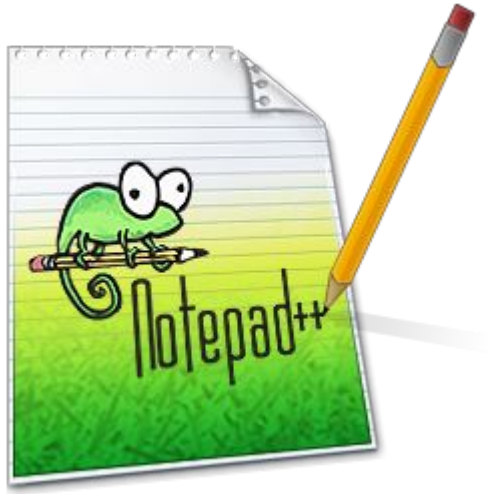
※ 프로그램 다운로드

실습 도구 [편집]

- Protege v5.6.4 for Windows 다운로드
- Notepad++ v8.7 for Windows 다운로드
- FileZilla Client v3.67 for Windows 다운로드
- FileZilla 사용법

https://dh.aks.ac.kr/~hyunseung/wiki/index.php/Knuch_2024-2_디지털유산프로젝트

마무리 : 메모장으로 파일 열어보기



마무리 : 메모장으로 파일 열어보기

```
<?xml version="1.0"?>
<rdf:RDF xmlns="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
     xml:base="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
     xmlns:ekc="http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#"
     xmlns:khs="http://dh.aks.ac.kr/ontologies/khs#"
     xmlns:owl="http://www.w3.org/2002/07/owl#"
     xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
     xmlns:xml="http://www.w3.org/XML/1998/namespace"
     xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
     xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
     xmlns:dcterms="http://purl.org/dc/terms#">
    <owl:Ontology rdf:about="http://dh.aks.ac.kr/ontologies/khs">
        <rdfs:comment xml:lang="ko">김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온톨로지이다.
        </rdfs:comment>
    </owl:Ontology>
```

마무리 : 메모장으로 파일 열어보기

```
17
18      <!--
19      ///////////////////////////////////////////////////////////////////////////////////////
20      //
21      // Object Properties
22      //
23      ///////////////////////////////////////////////////////////////////////////////////////
24       -->
25
26
27
28
29      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf -->
30
31      <owl:ObjectProperty rdf:about=
        "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf">
32          <owl:inverseOf rdf:resource="http://purl.org/dc/terms/creator"/>
33          <rdfs:domain rdf:resource=
            "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor"/>
34          <rdfs:range rdf:resource=
            "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Object"/>
35      </owl:ObjectProperty>
36
```

마무리 : 메모장으로 파일 열어보기

```
59      <!--
60      ///////////////////////////////////////////////////////////////////////////////////////
61      //
62      // Data properties
63      //
64      ///////////////////////////////////////////////////////////////////////////////////////
65       -->
66
67
68
69
70      <!-- http://purl.org/dc/terms/Title -->
71
72      <owl:DatatypeProperty rdf:about="http://purl.org/dc/terms/Title">
73          <rdfs:domain rdf:resource="http://www.w3.org/2002/07/owl#Thing"/>
74          <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#string"/>
75      </owl:DatatypeProperty>
76
```

마무리 : 메모장으로 파일 열어보기

```
79      <!--
80      ///////////////////////////////////////////////////////////////////////////////////
81      //
82      // Classes
83      //
84      ///////////////////////////////////////////////////////////////////////////////////
85       -->
86
87
88
89
90      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor -->
91
92      <owl:Class rdf:about=
        "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor">
93          <rdfs:comment xml:lang="ko">행위자</rdfs:comment>
94      </owl:Class>
95
96
97
98      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group -->
99
100     <owl:Class rdf:about=
        "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group">
101         <rdfs:subClassOf rdf:resource=
            "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor"/>
102     </owl:Class>
103
```

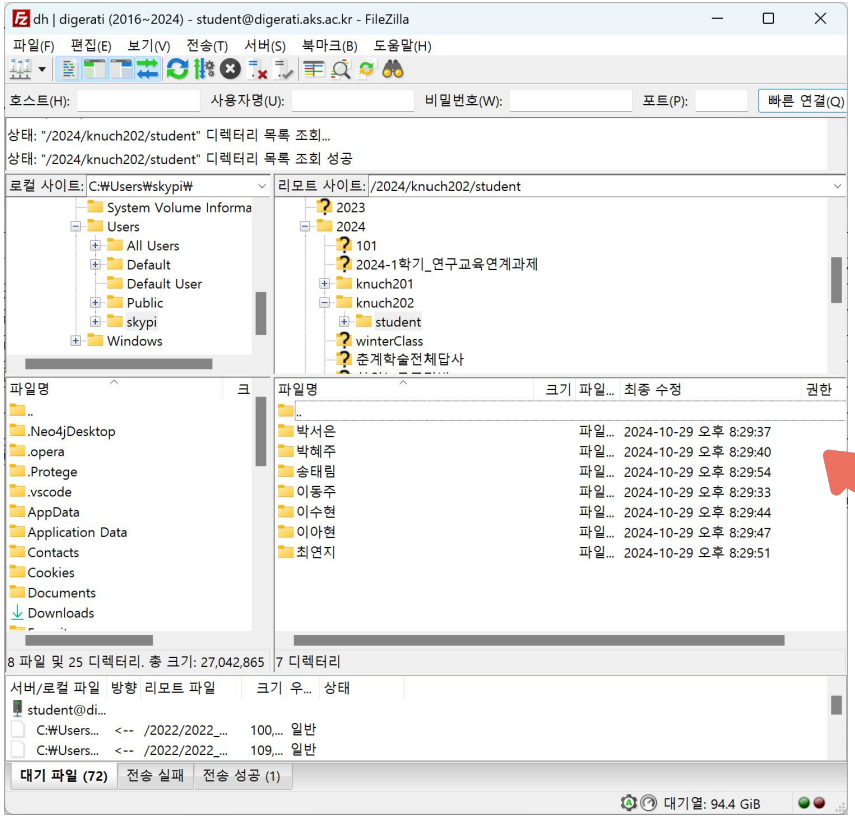
마무리 : 메모장으로 파일 열어보기

```
134
135     <!-- Generated by the OWL API (version 4.5.29.2024-05-13T12:11:03Z)
        https://github.com/owlcs/owlapi -->
136
137
```

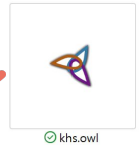
<!-- Generated by koreandressdhedu@gmail.com / 2024.10.30. -->

본인 연락처와 파일 작성 날짜로 수정

마무리 : 파일 업로드



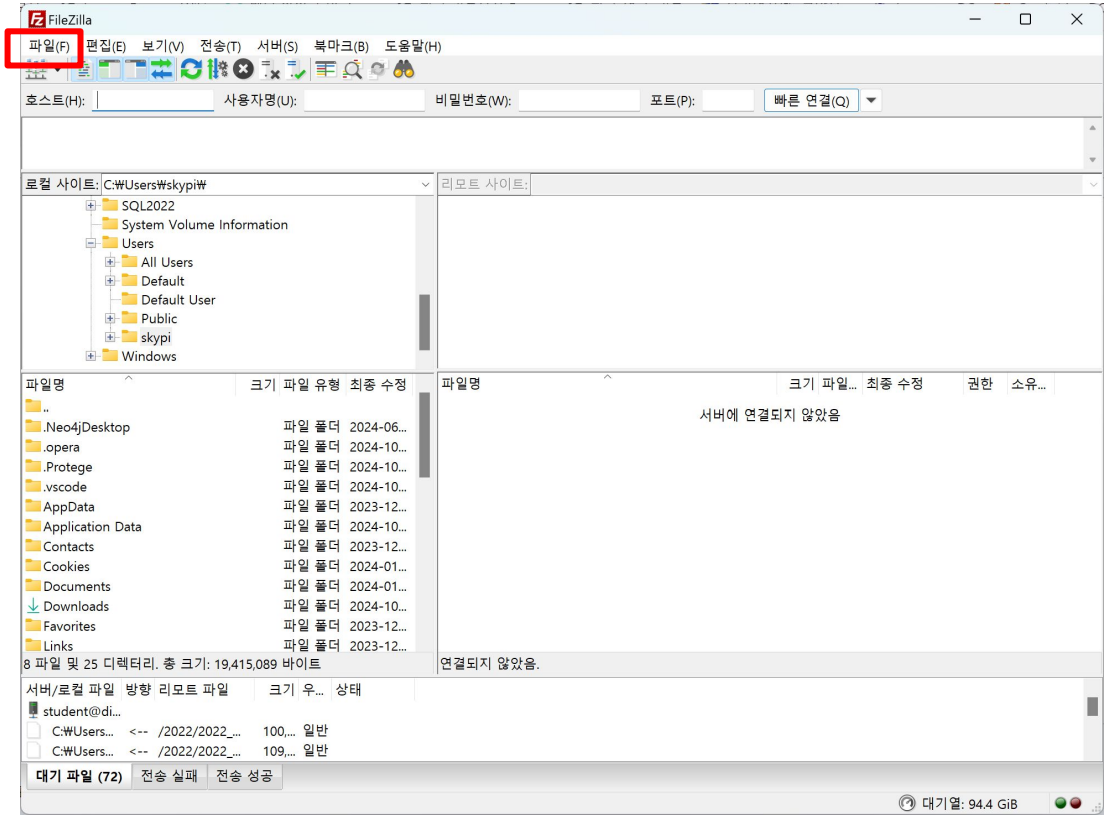
/2024/knuch202/student



각자 본인 폴더에
.owl 또는 .rdf
파일 업로드 완료하기

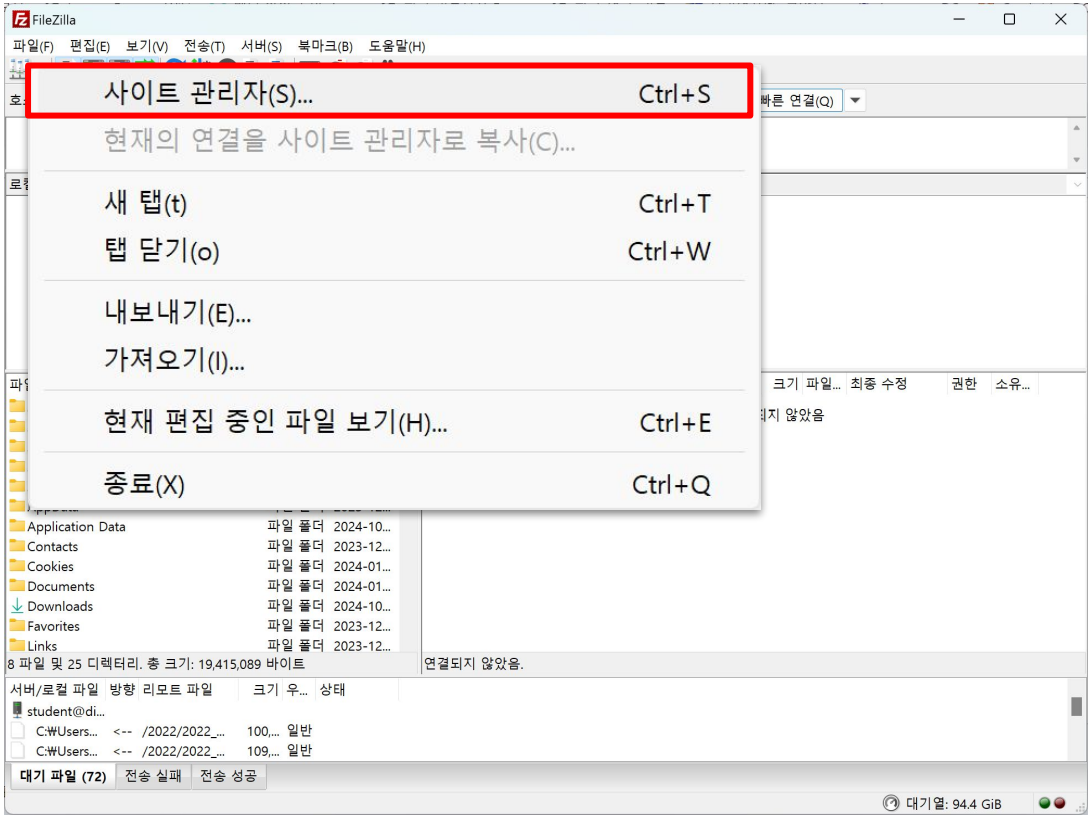
※ FileZilla

파일 메뉴 클릭



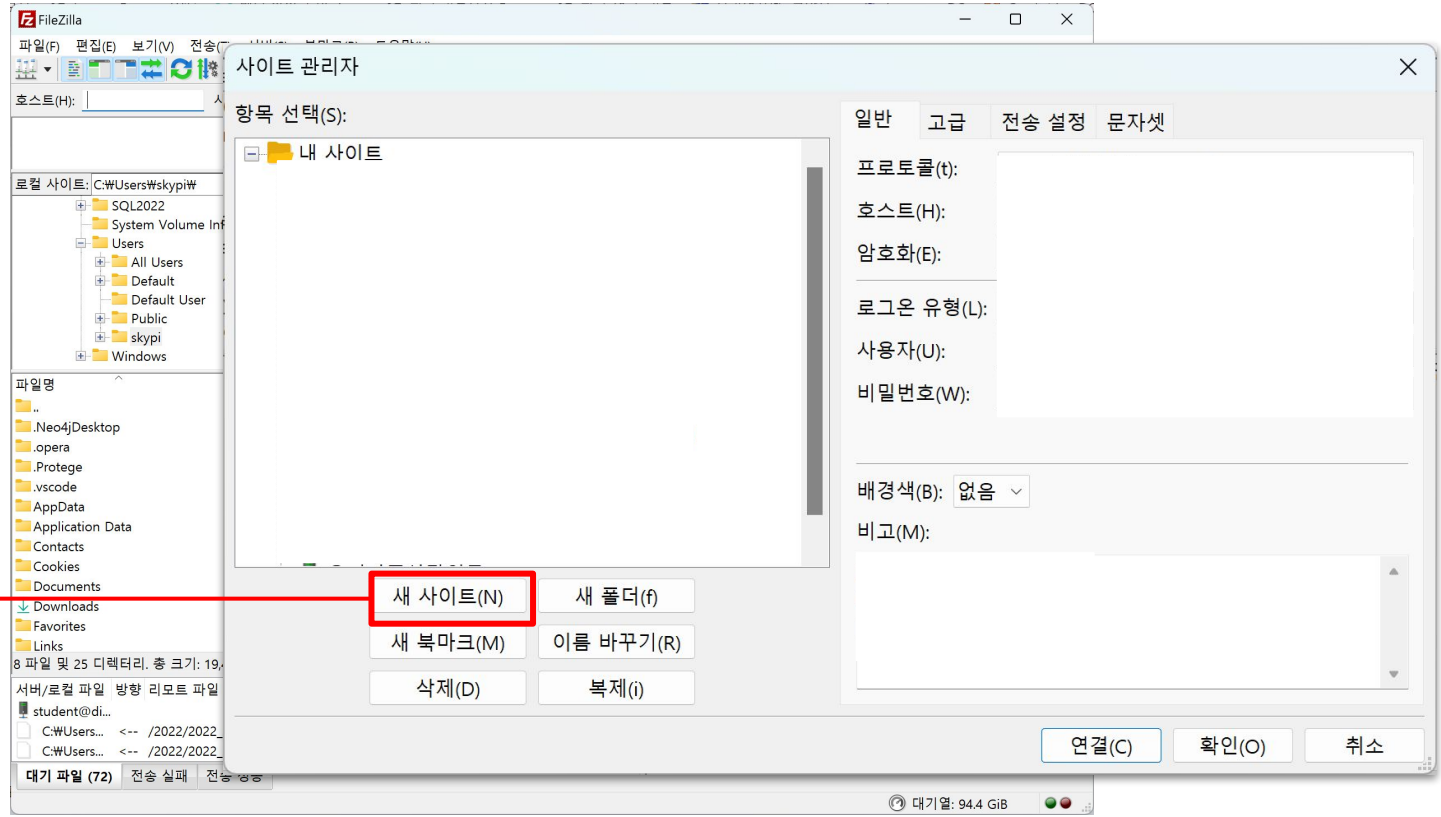
※ FileZilla

사이트 관리자 클릭



※ FileZilla

새 사이트 클릭



※ FileZilla

① 새 사이트 이름 자유롭게 기재

↓

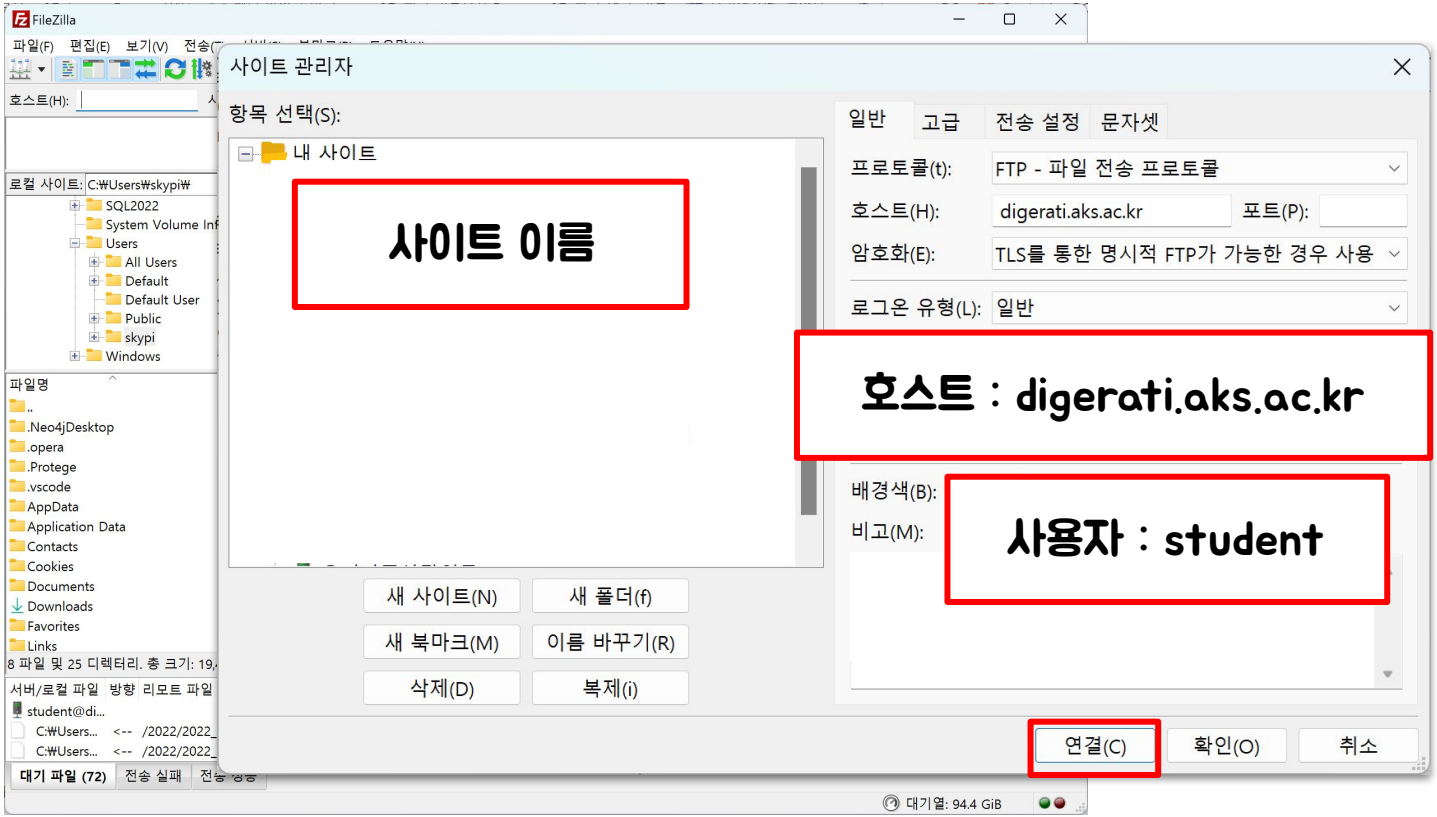
② 호스트 작성

↓

③ 사용자 / 비밀번호 입력

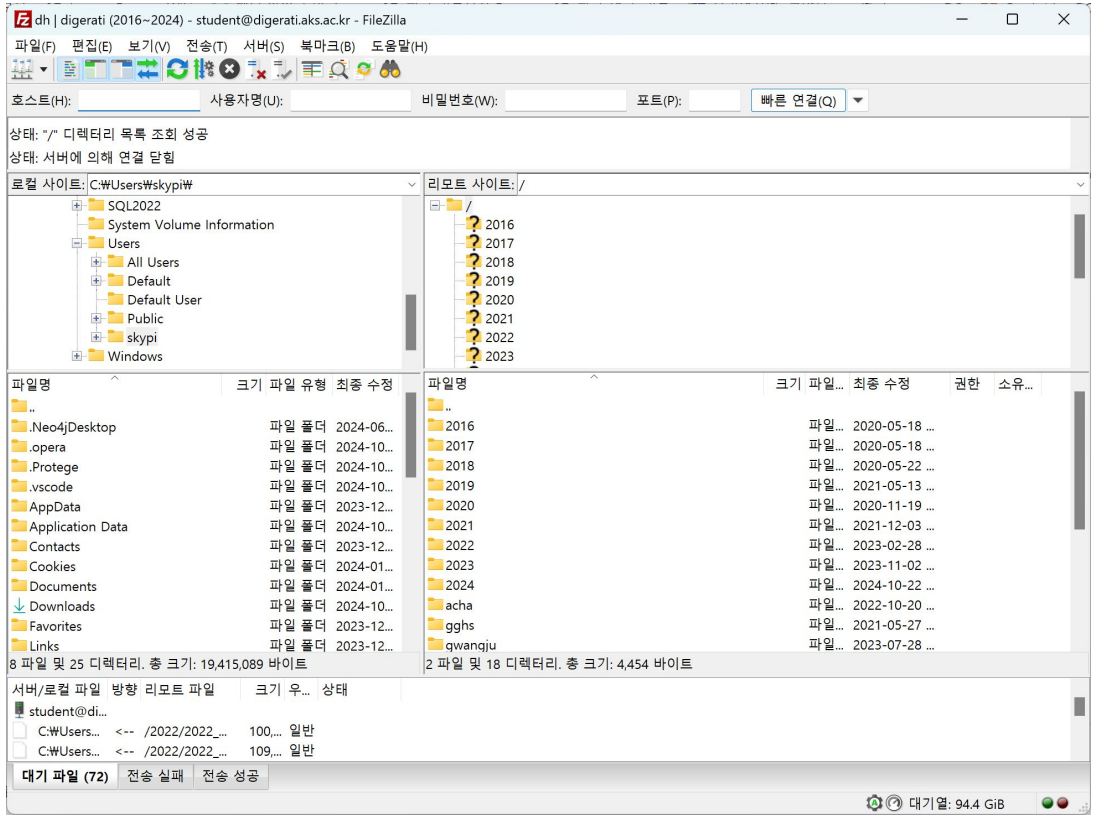
↓

④ 연결 클릭

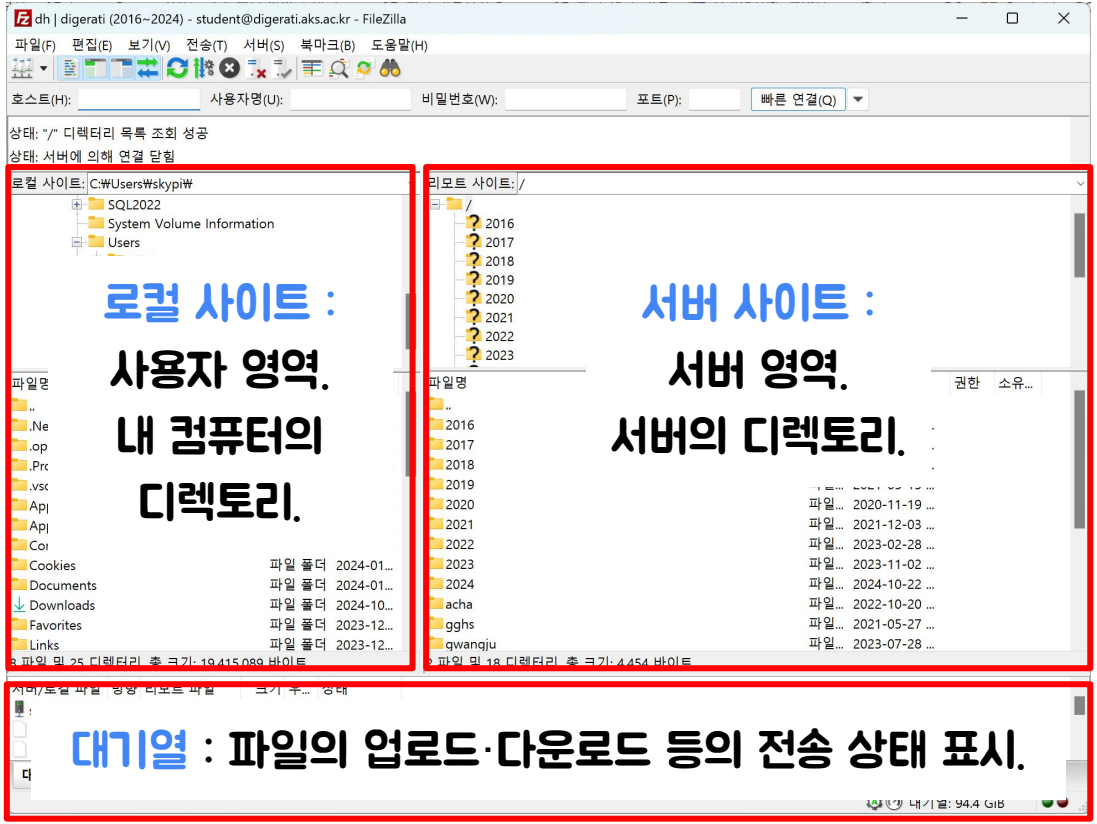


※ FileZilla

연결 완료



※ FileZilla


dh | digerati (2016~2024) - student@digerati.aks.ac.kr - FileZilla
파일(F) 편집(E) 보기(V) 전송(T) 서버(S) 북마크(B) 도움말(H)
호스트(H): 사용자명(U): 비밀번호(W): 포트(P): 빠른 연결(Q)
상태: "/" 디렉터리 목록 조회 성공
상태: 서버에 의해 연결 닫힘
로컬 사이트: C:₩Users₩skypi₩
SQL2022
System Volume Information
Users
로컬 사이트 :
사용자 영역.
내 컴퓨터의
디렉토리.
Cookies 파일 폴더 2024-01...
Documents 파일 폴더 2024-01...
Downloads 파일 폴더 2024-10...
Favorites 파일 폴더 2023-12...
Links 파일 폴더 2023-12...
리모트 사이트: /
2016
2017
2018
2019
2020
2021
2022
2023
서버 사이트 :
서버 영역.
서버의 디렉토리.
파일명 권한 소유...
2020 파일... 2020-11-19 ...
2021 파일... 2021-12-03 ...
2022 파일... 2023-02-28 ...
2023 파일... 2023-11-02 ...
2024 파일... 2024-10-22 ...
acha 파일... 2022-10-20 ...
gghs 파일... 2021-05-27 ...
qwanqju 파일... 2023-07-28 ...
대기열 : 파일의 업로드·다운로드 등의 전송 상태 표시.

FileZilla

파일질라 사용법

https://dh.aks.ac.kr/Edu/wiki/index.php/튜토리얼/ftp